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Summary of Fish Population Data from Rat and Threepoint Lakes, 1989

By Green, D.J. 1990

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ABSTRACT

Experimental netting was continued on Rat and Threepoint lakes in 1989 as part of the Churchill River Diversion Ecological Monitoring Program (Claim #18 of the Northern Flood Agreement).

Data analysis summaries for age, size and maturity conditions from fish caught in 1989 are presented so as to provide easy access to this information for future reference.

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INTRODUCTION

Rat and Threepoint lakes are located on the Rat - Burntwood River system in Manitoba. These lakes were flooded in connection with hydro-electric development and the Churchill River Diversion. Rat Lake is upstream while Threepoint Lake is downstream of the Notigi Control Dam. Initial flooding of Rat Lake began in 1974 with the closure of outflows from Notigi Lake during the construction of Notigi Dam. Threepoint Lake started flooding from increased flows caused by diverted Churchill River water from Southern Indian Lake (South Bay) into the Rat River in 1976.

Concerns by Native Indian bands affected by the hydro-electric development led to the bands forming the Northern Flood Committee (NFC) in 1974. In 1977, the Northern Flood Agreement (NFA) was signed by the NFC, the Government of Canada, the Government of Manitoba and Manitoba Hydro. Previous data collection of Rat and Threepoint lakes by Manitoba Fisheries Branch began in 1983 under NFA Claim #12 - Mercury Monitoring Agreement. Data collection under Claim #12 ended in 1985 and data collection under the implementation of NFA Claim #18 - Ecological Assessment began.

The basic purpose of the Ecological Assessment Fisheries Project is to determine the impact of hydro-electric development on fish resources within the affected area.

The purpose of this report is to give a baseline analysis and summary of data collected from Rat and Threepoint lakes in 1989, so it may be readily available for future reference.

METHODS

Fish samples were collected with standard gangs of gillnets. These gangs consisted of various mesh sizes as follows: 1.5", 2.0", 3.0", 3.75", 4.25" and 5.0" stretched measure. Each net was 22.9 m (25 yd) long and 1.8 m (6 ft) deep. Gillnet sets were set on the bottom and overnight for 16 - 20 h duration.

Fork length and round weight measurements were recorded for all fish caught. Sex and state of maturity were recorded and ageing structures were taken from the principal commercial fish species of lake whitefish, walleye, sauger and northern pike as well as some white, longnose and shorthead redhorse suckers. Ageing structures were collected as follows: otoliths and first three pectoral fin rays from whitefish, otoliths and first three dorsal spines from walleye and sauger, the left cliethrum and first three pectoral fin rays from northern pike, and the left pectoral fin from sucker species.

Summaries and growth curve analysis were performed by the same methods as those described by Patalas, 1984 and Kirton, 1985. Presentation format of some tables has changed slightly from the previous reports.

RESULTS

Netting locations and number of sets remained consistent with previous years (Figs. 1-5, Tables 1-2). A total of 24 sets were made between June 12 - June 30 in Rat Lake and 20 sets were made between July 11 - August 11, 1989 in Threepoint Lake. The highest catch-per-unit effort occurred in Threepoint Lake (Table 3). Although more fish and the total weight harvested from Threepoint Lake was higher than in Rat Lake, the average weight of fish harvested was higher from Rat Lake (Tables 4 and 5). Mesh size effects on individual species are shown in Tables 6-21. Age frequencies from the "Total" column on these tables were used to derive age composition histograms (Fig. 6-11). Fork length frequency histograms are illustrated in Figures 12-18.

Age specific size and maturity data are shown for each sex and sexes combined in Tables 22-35. Information from these tables was used to derive growth curves (Figs. 19-24, Tables 40-42), mortality estimates (Table 38) and maturity rate estimates (Table 39). Growth curves illustrated in Figures 19-24 show the von Bertallanfy curve (solid line) and the least squares regression "power" curve (dashed line). All points (mean lengths from combined sexes) were used for the least squares regression. Two exceptions occurred in the Treepoint Lake data. Age class 0 was deleted for walleye and northern pike regression analysis. Average length data deleted from the Walford and Brody analysis during the derivation of the von Bertallanfy equation are illustrated by darkened squares in Fig. 19-24. Length-weight regressions were calculated using all individual points (Tables 36-37).

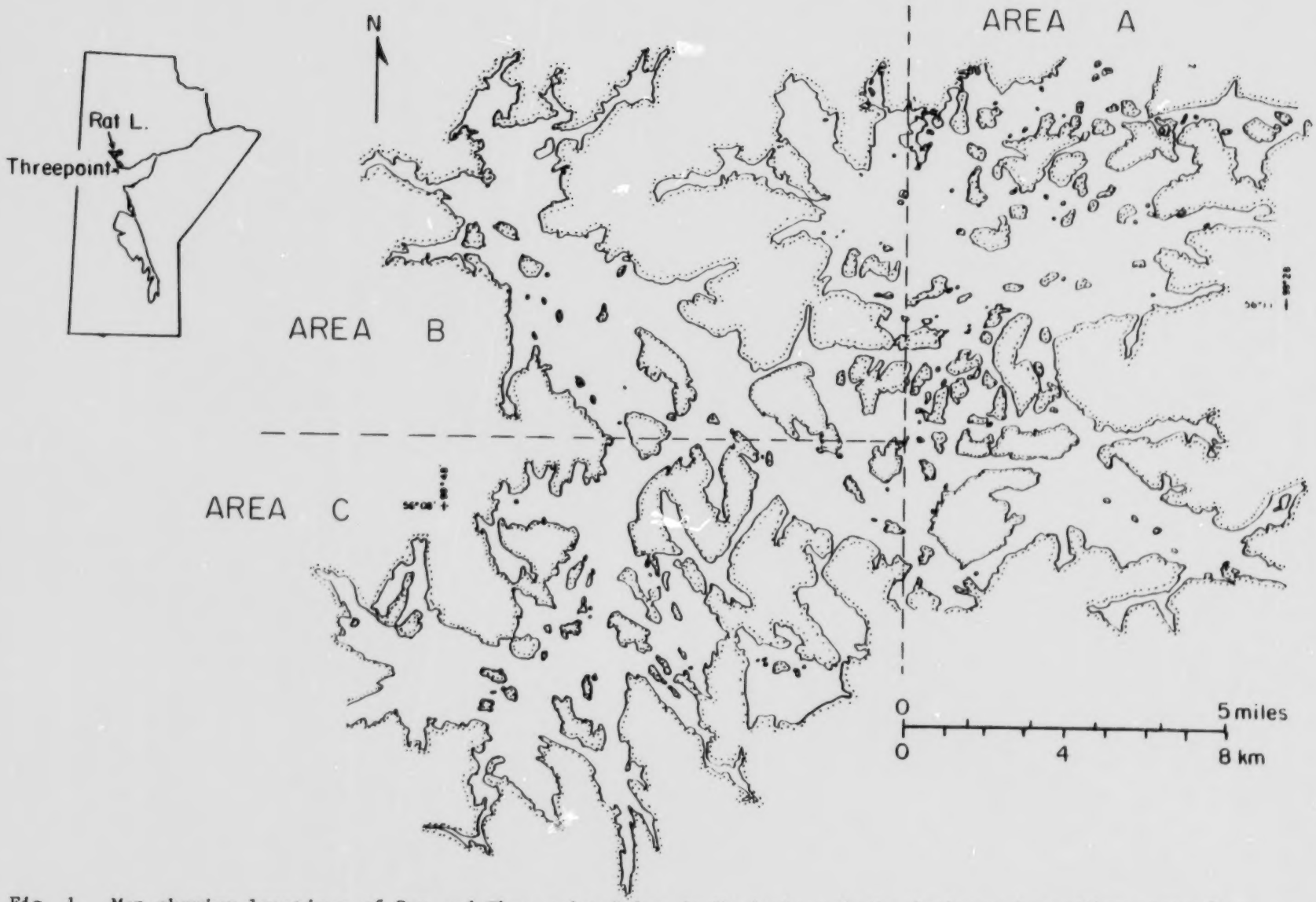

Fig. 1. Map showing locations of Rat and Threepoint lakes in Manitoba and the designated sampling areas from Rat Lake, 1989.

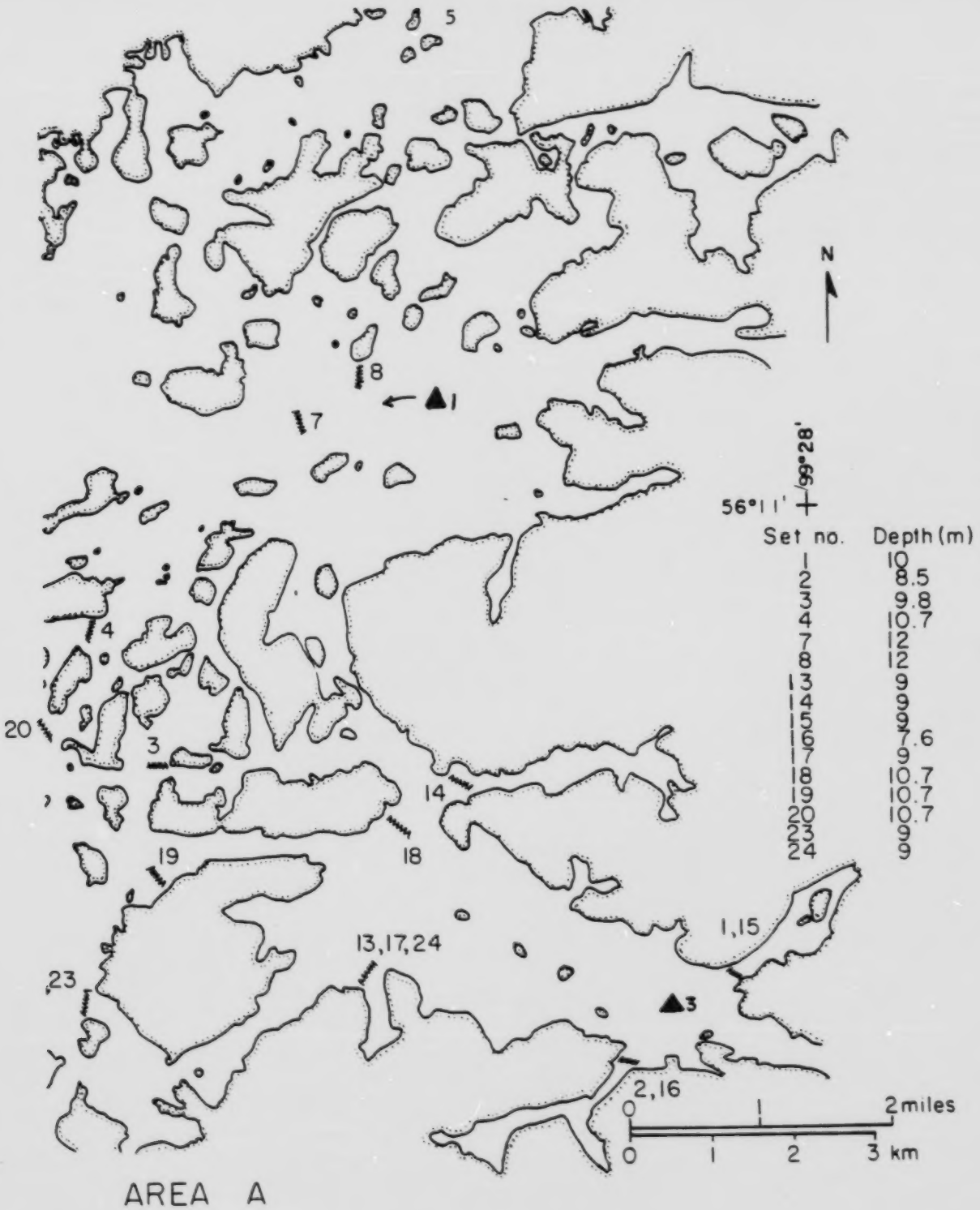

Fig. 2. Netting locations and depths of sets from Area A of Rat Lake, 1989. Limnological sites (▲1 and ▲3) are also shown.

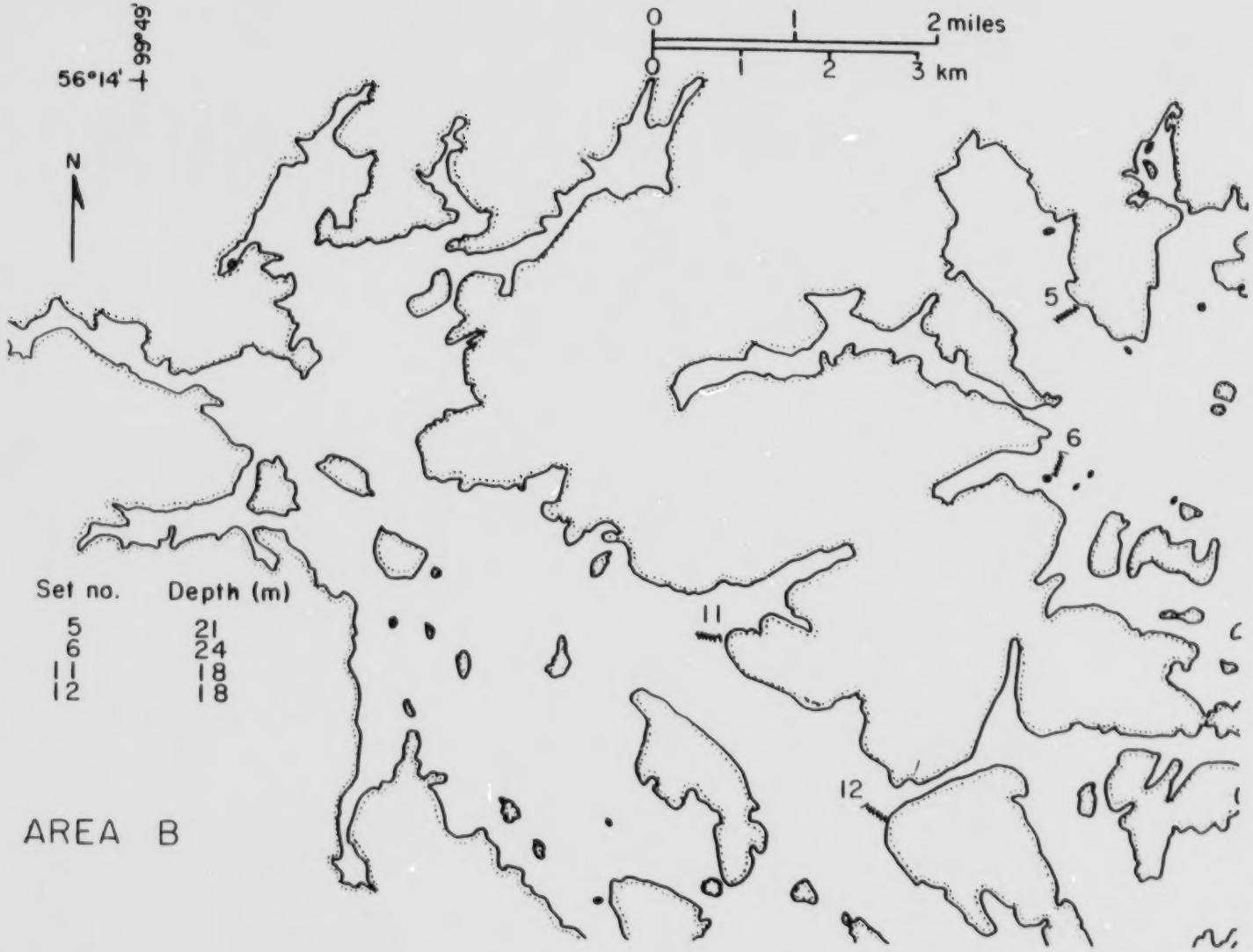

Fig. 3. Netting locations and depths of sets from Area B of Rat Lake, 1989.

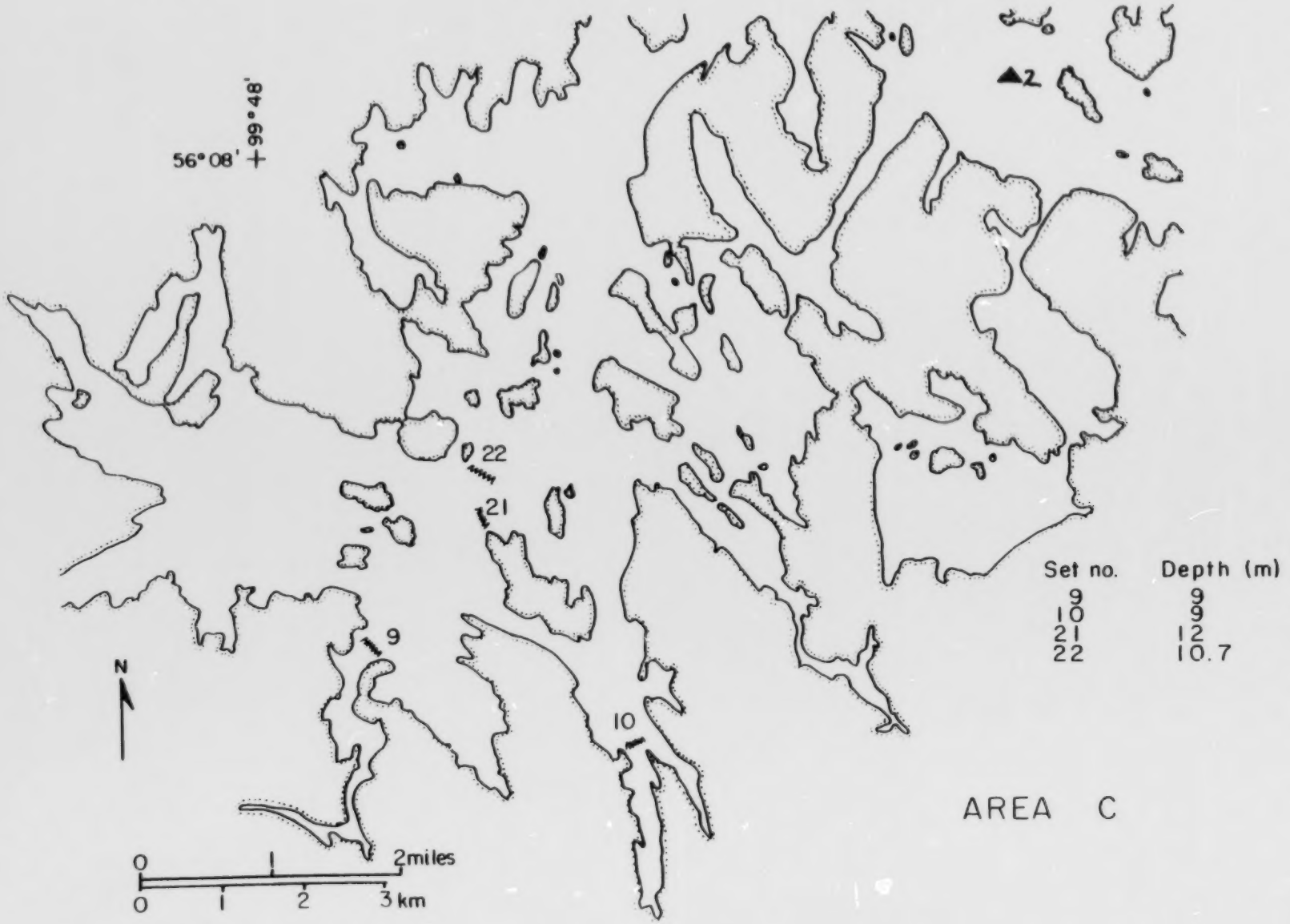

Fig. 4. Netting locations and depths of sets from Area C of Rat Lake, 1989. Limnological site (▲2) is also shown.

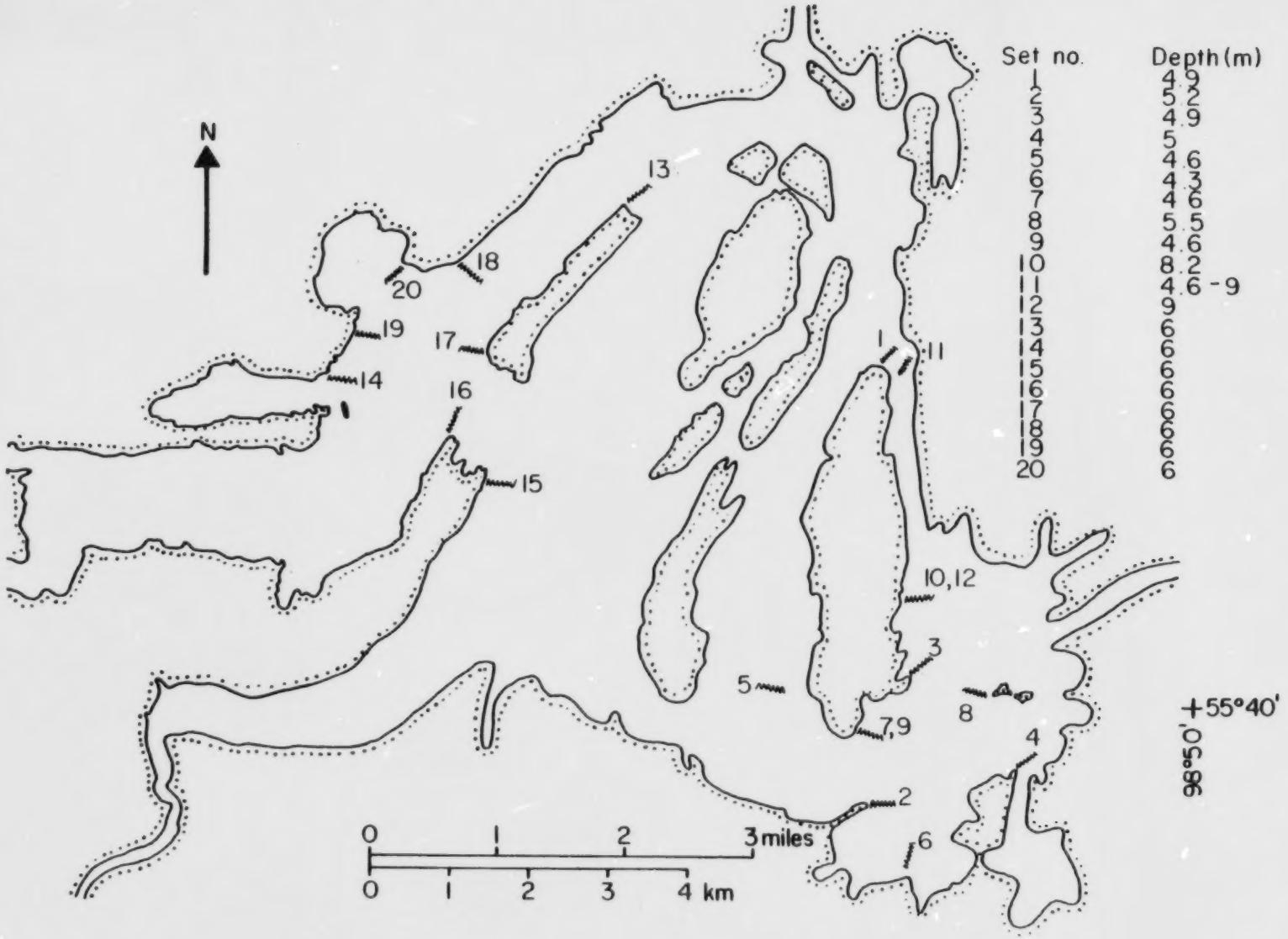

Fig. 5. Netting locations and depths of sets from Threepoint Lake, 1989.

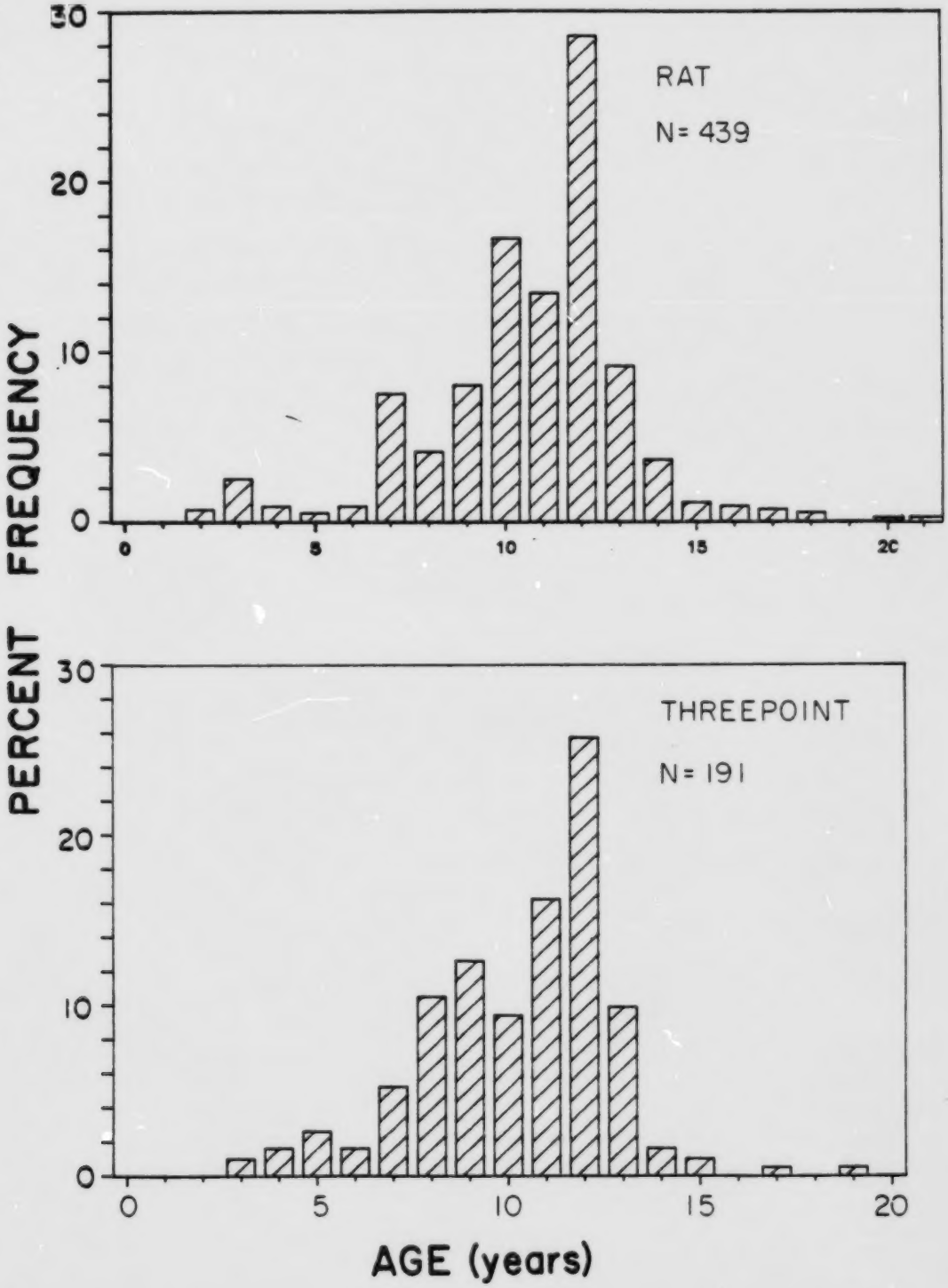

Fig.6. Age compositions for whitefish from Rat and Threepoint lakes, 1989.

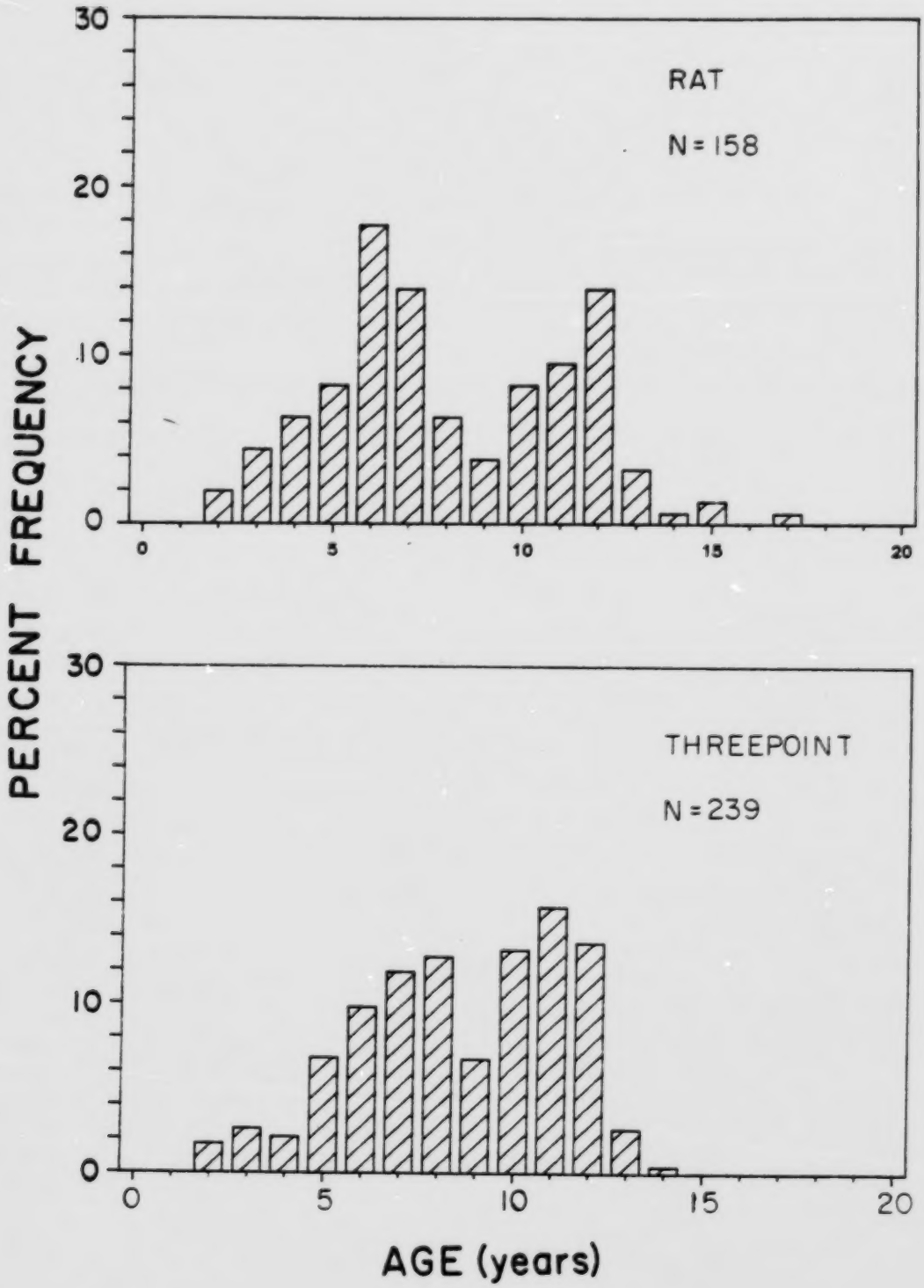

Fig. 7. Age compositions for cisco from Rat and Threepoint lakes, 1989.

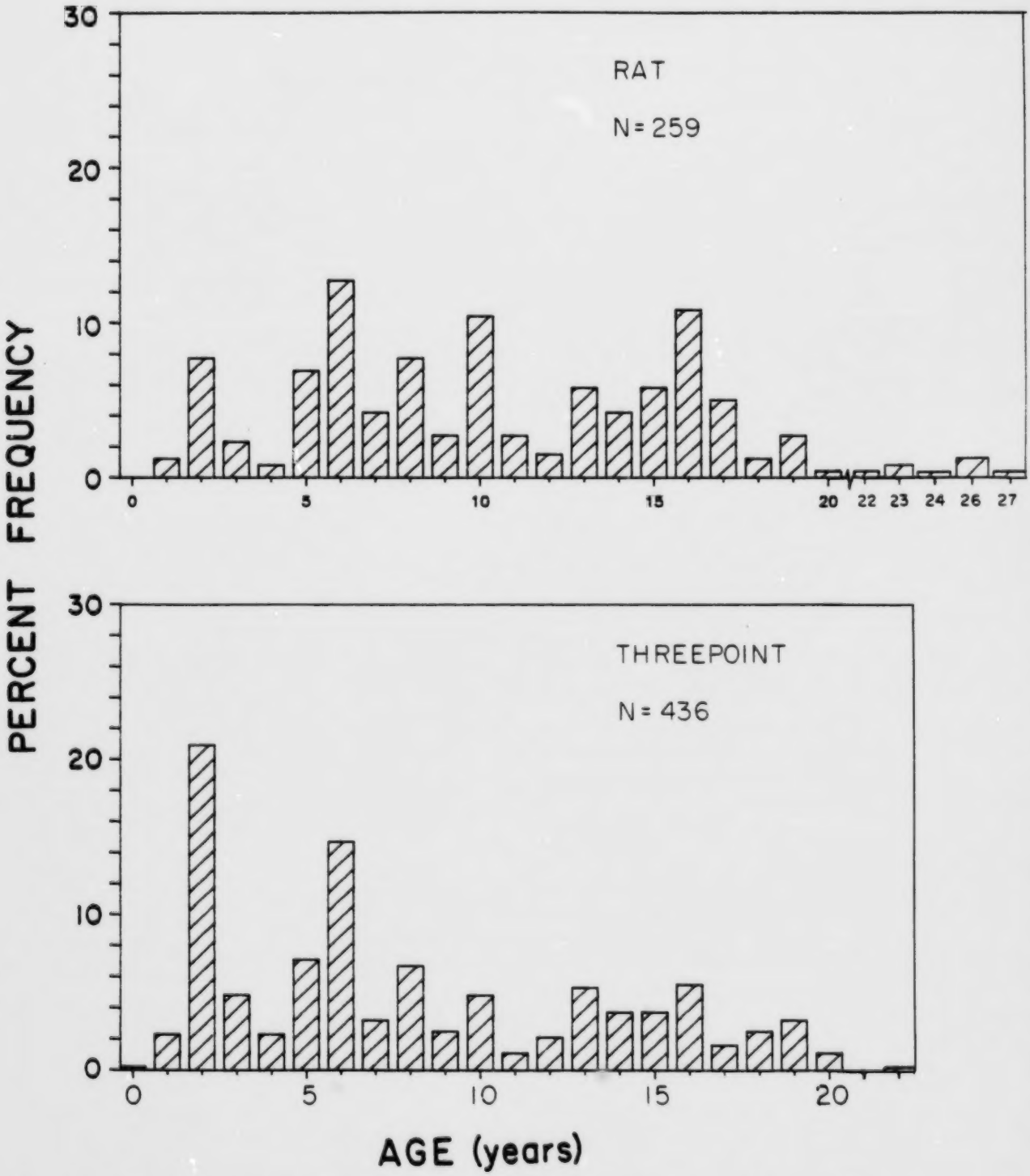

Fig. 8. Age compositions for walleye from Rat and Threepoint lakes, 1989.

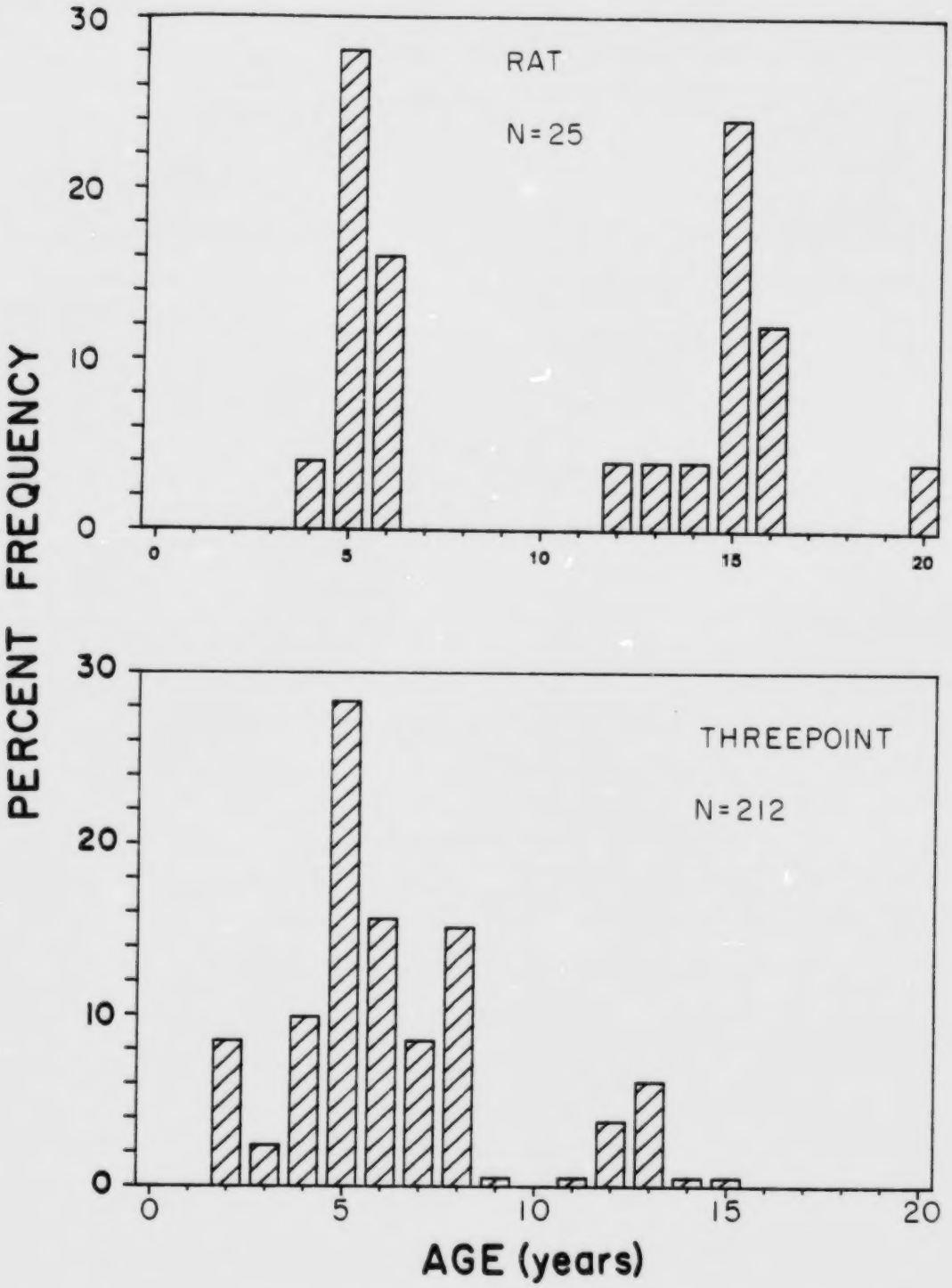

Fig. 9. Age compositions for sauger from Rat and Threepoint lakes, 1989.

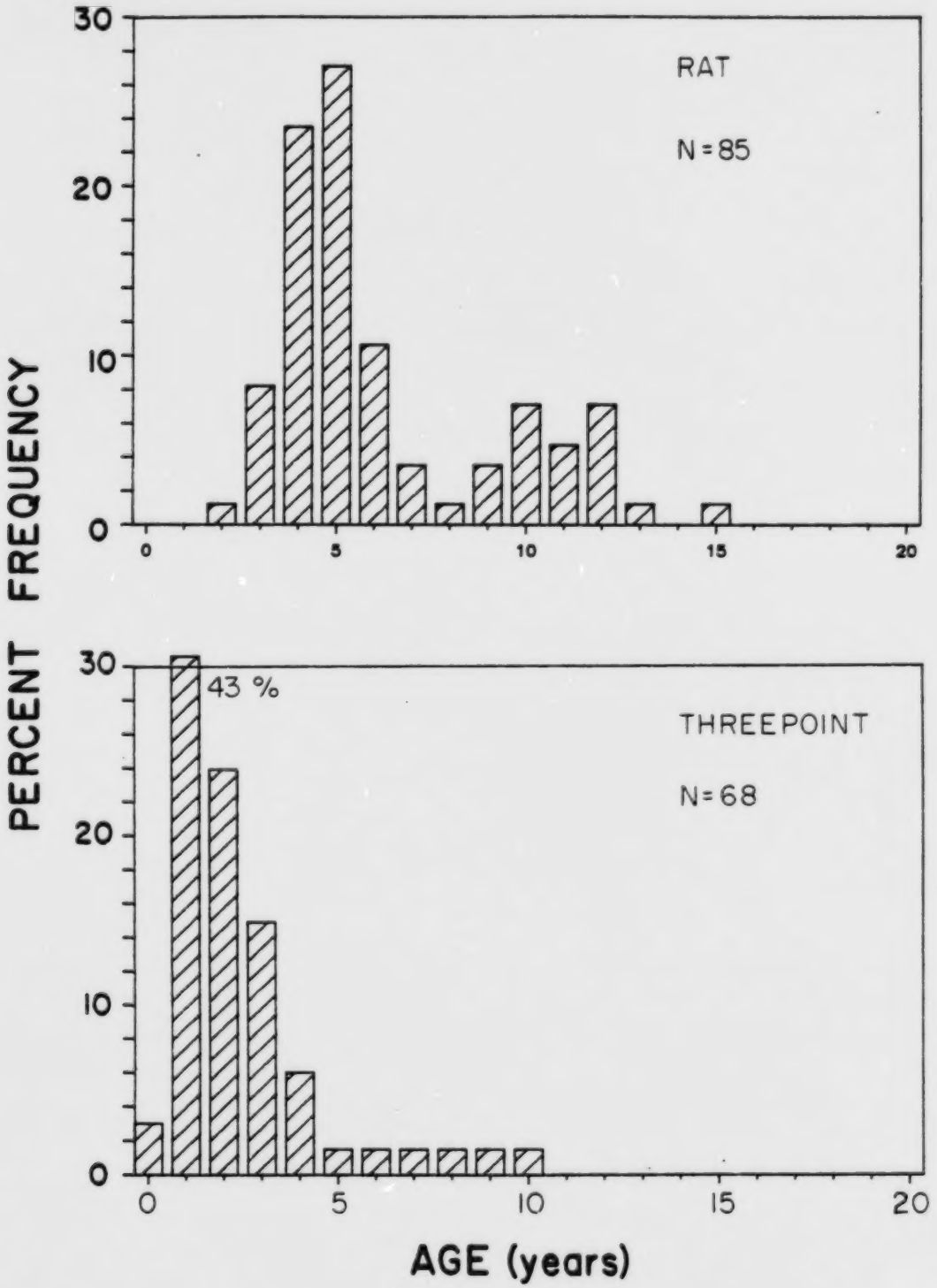

Fig. 10. Age compositions for northern pike from Rat and Threepoint lakes, 1989.

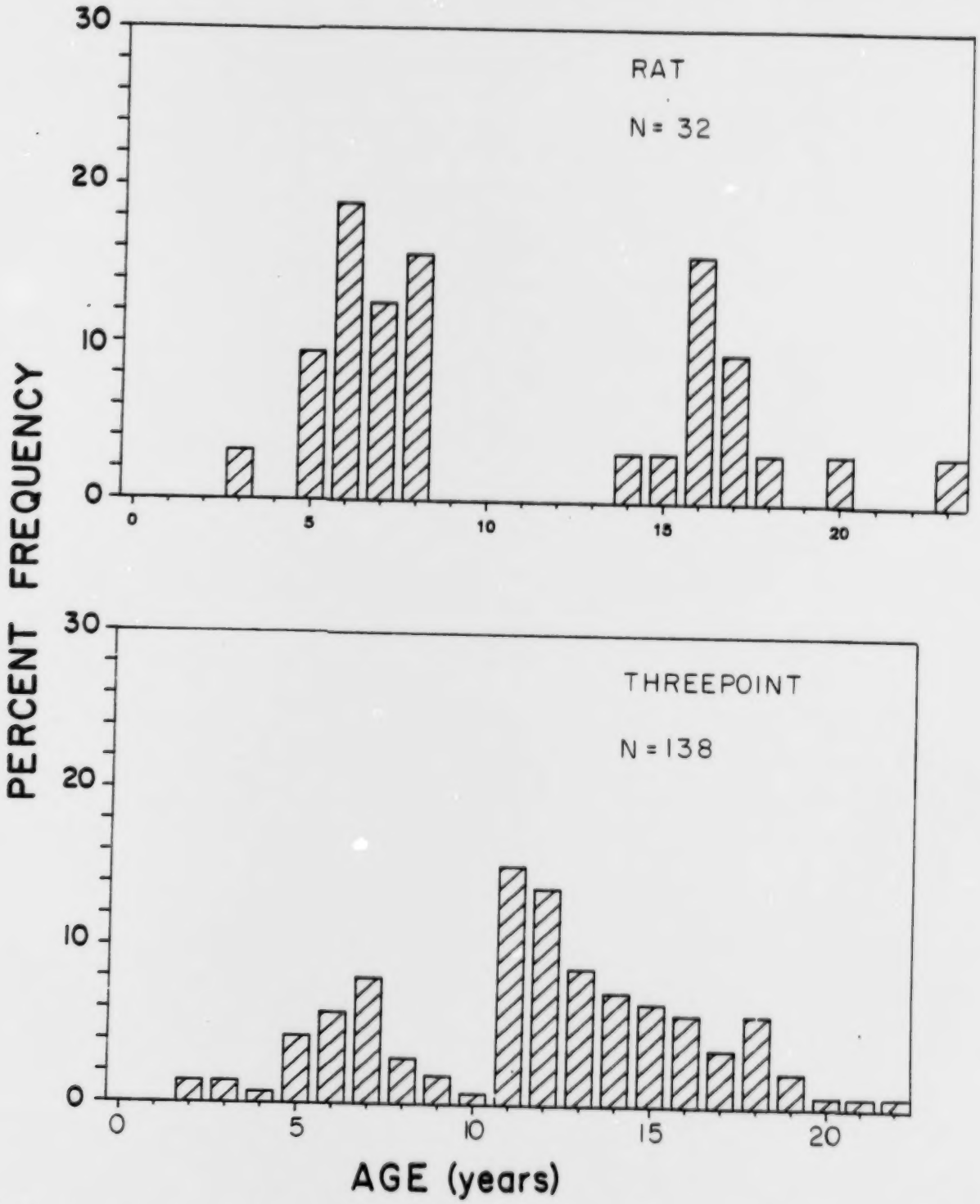

Fig. 11. Age compositions for white sucker from Rat and Threepoint lakes, 1989.

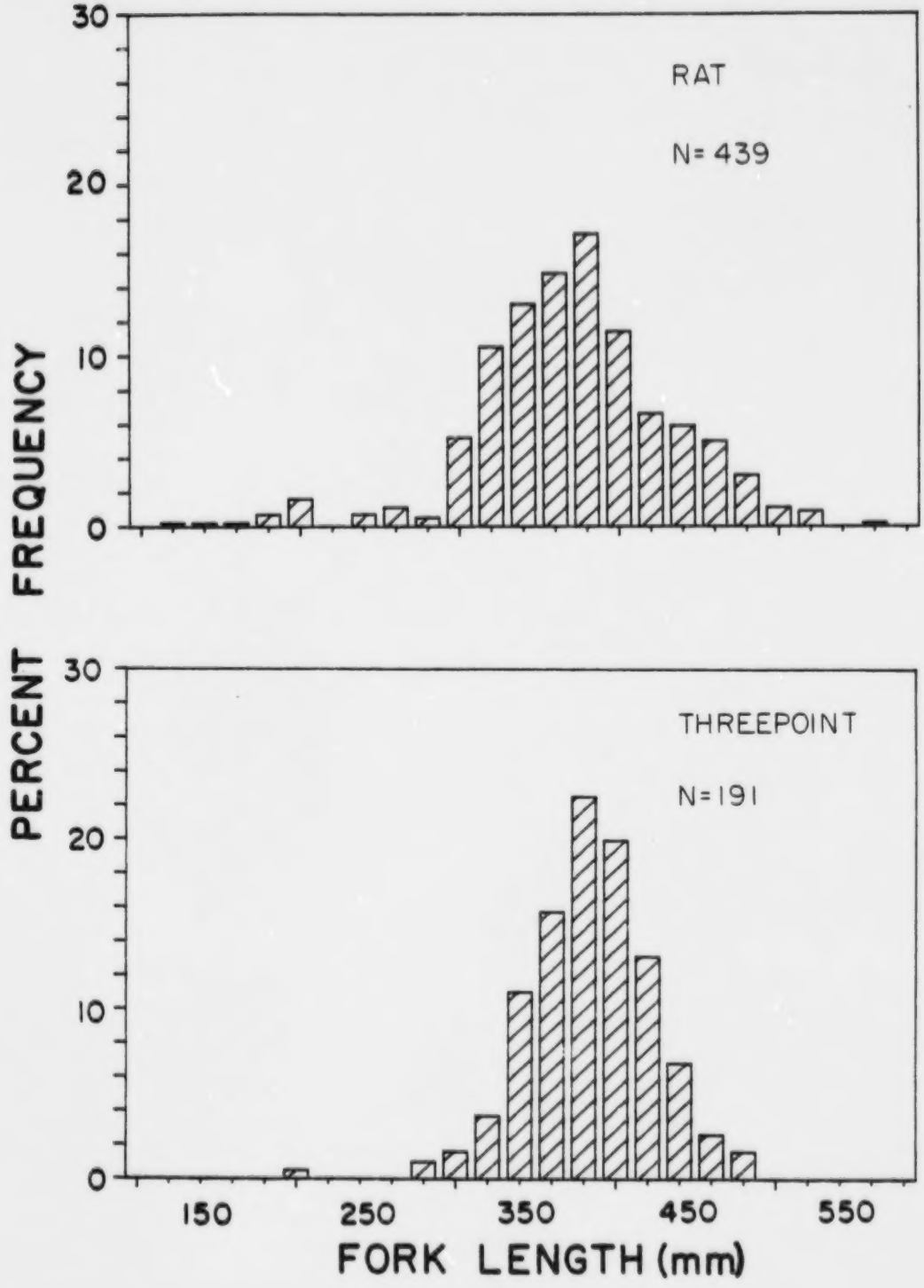

Fig. 12. Fork length frequencies for whitefish from Rat and Threepoint lakes, 1989.

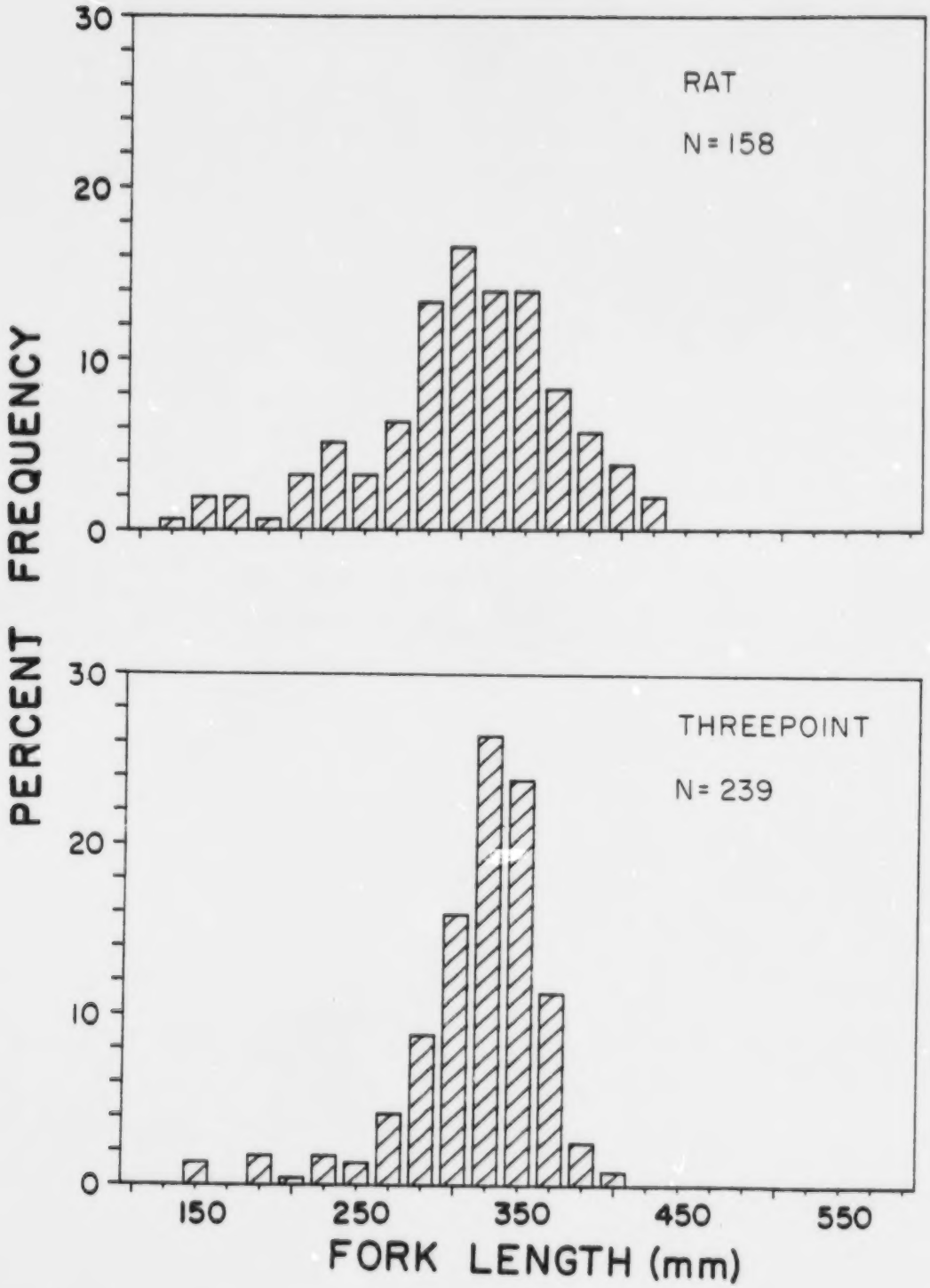

Fig. 13. Fork length frequencies for cisco from Rat and Threepoint lakes, 1989.

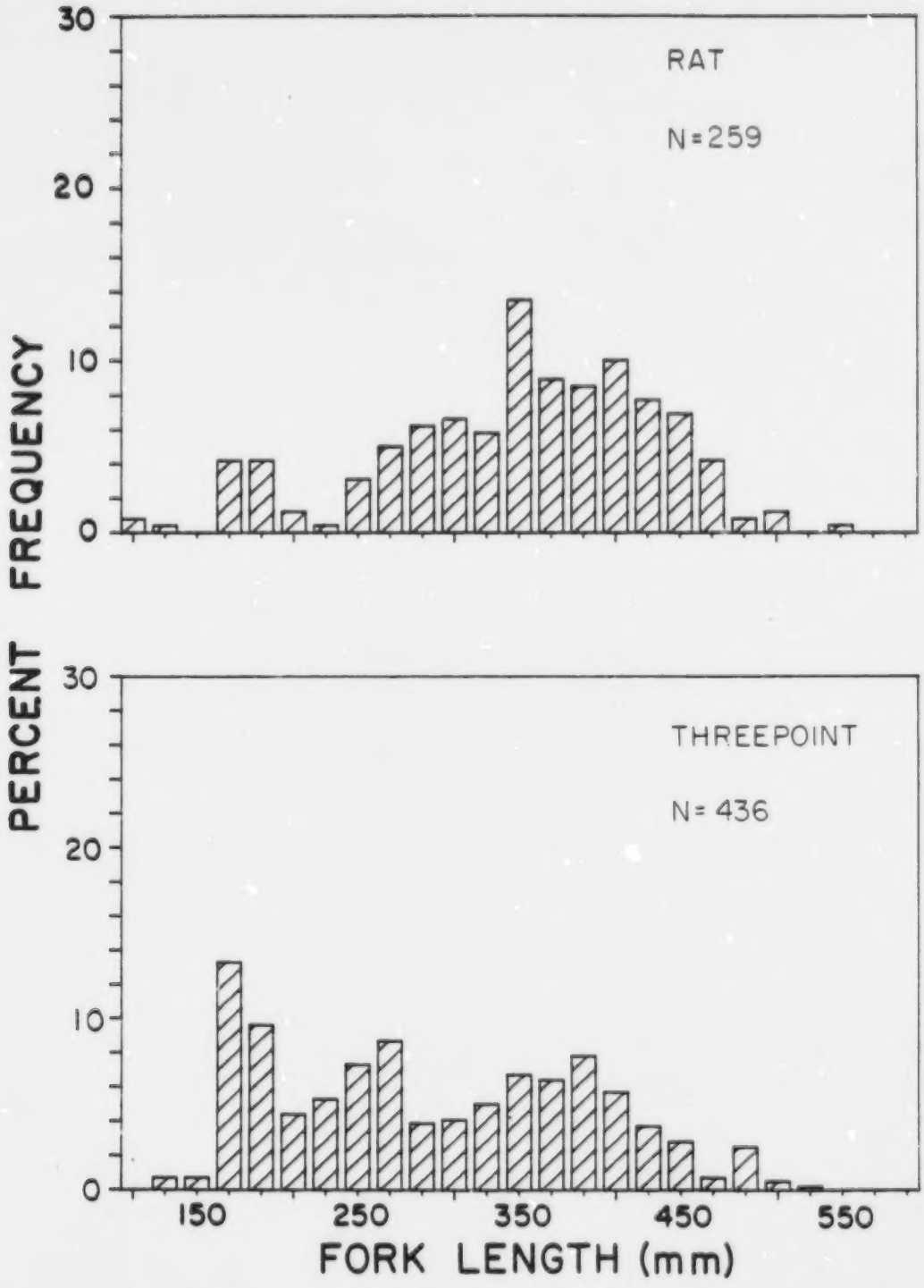

Fig. 14. Fork length frequencies for walleye from Rat and Threepoint lakes, 1989.

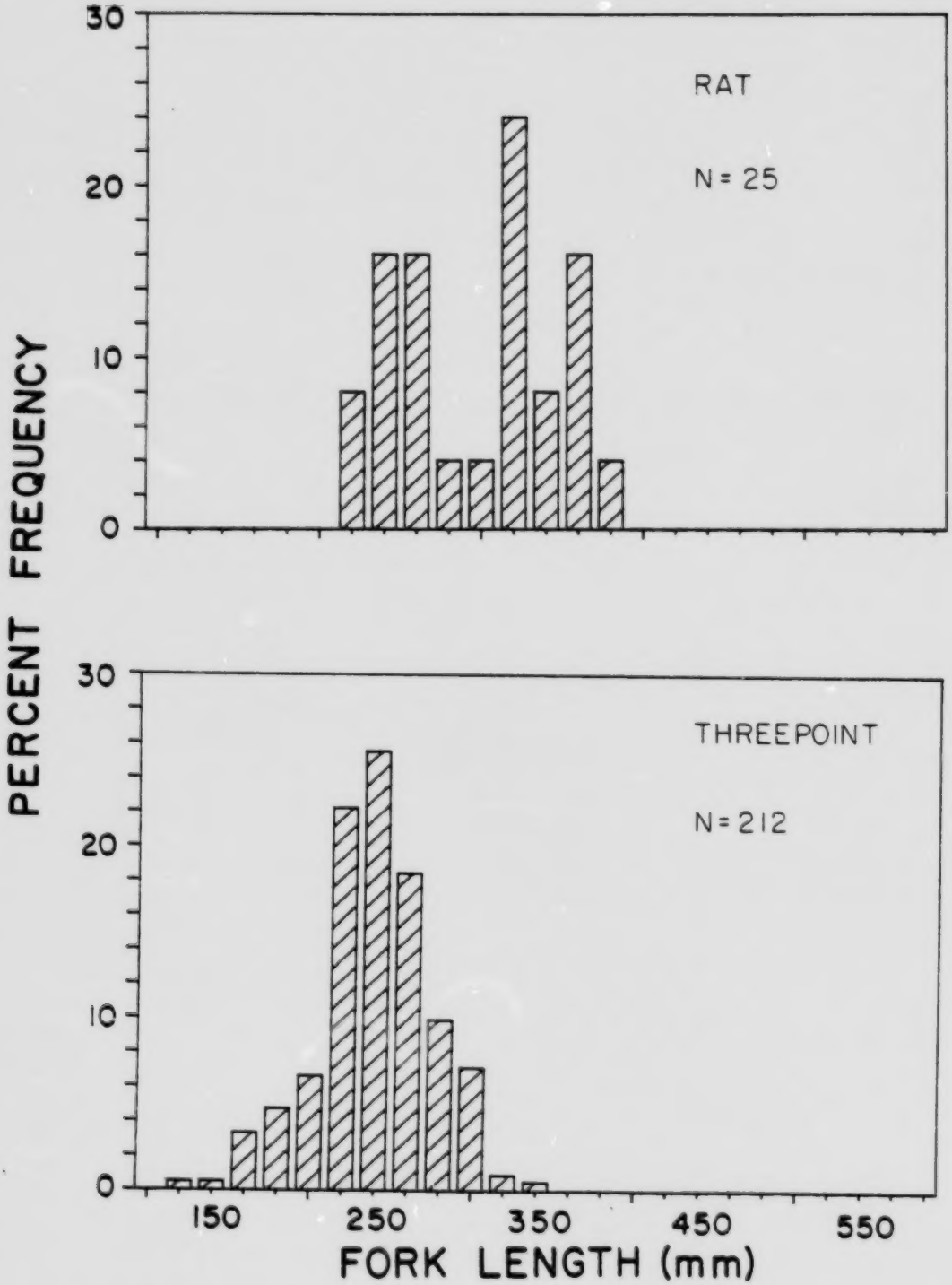

Fig. 15. Fork length frequencies for sauger from Rat and Threepoint lakes, 1989.

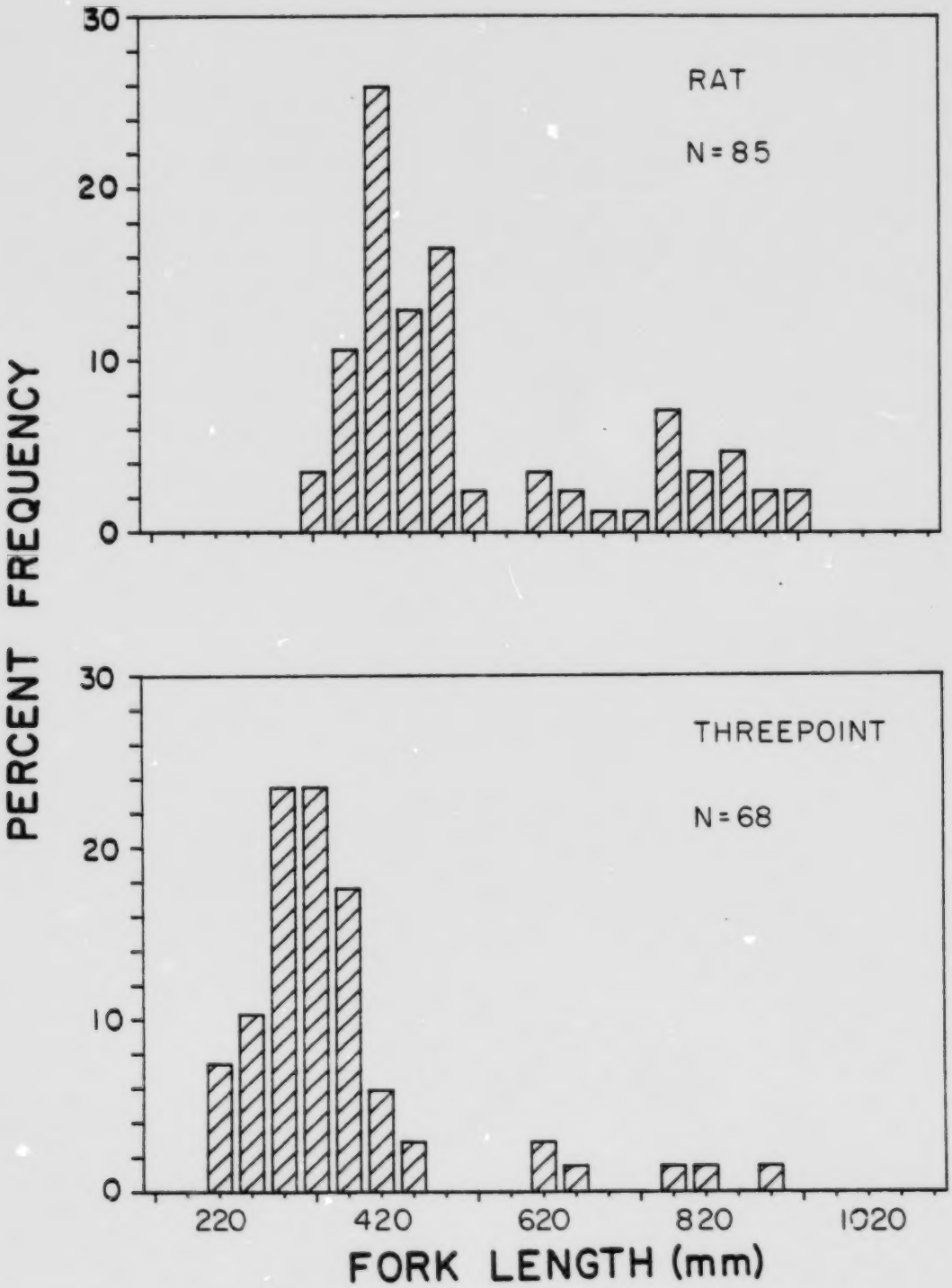

Fig. 16. Fork length frequencies for northern pike from Rat and Threepoint lakes, 1989.

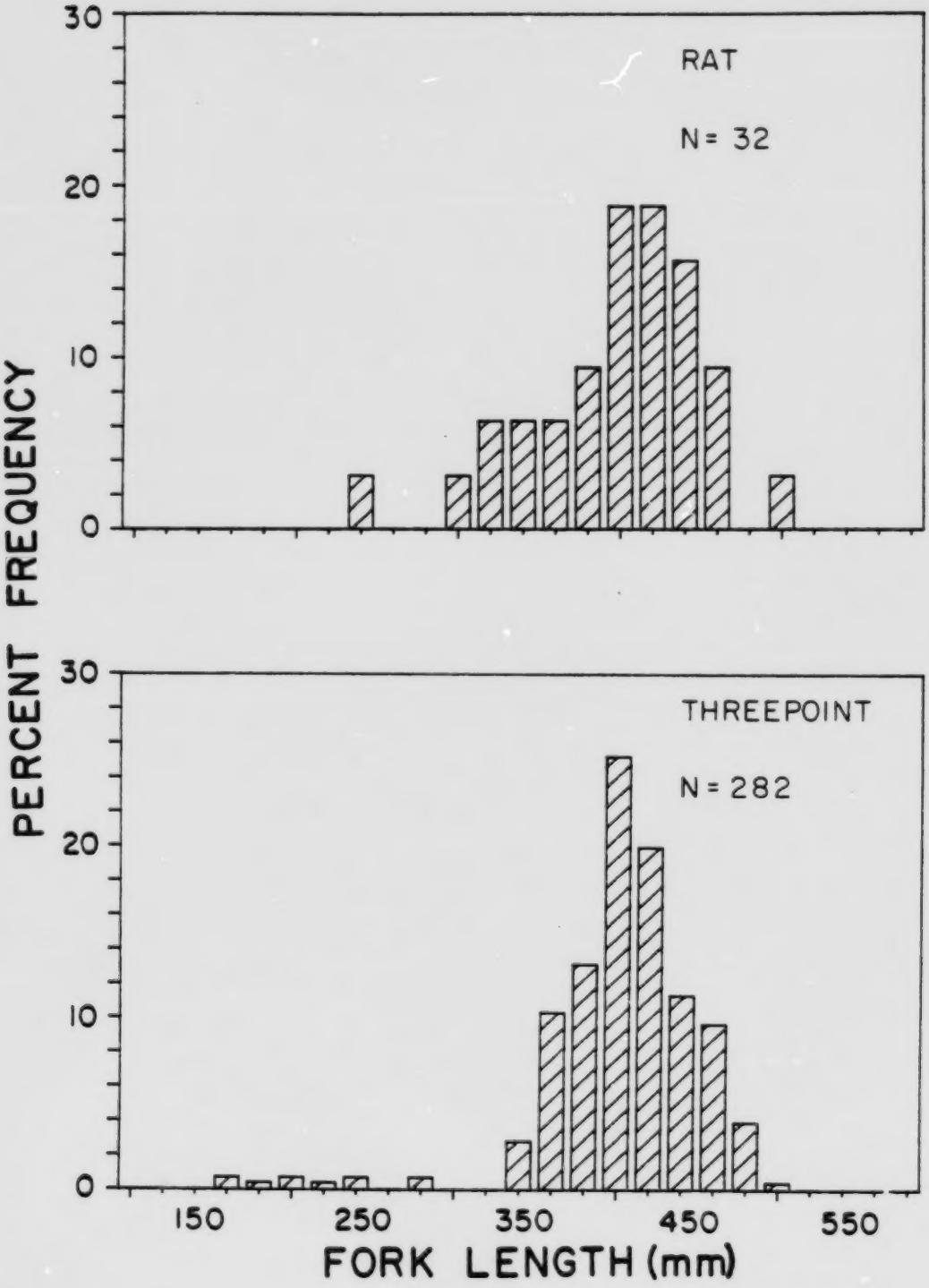

Fig. 17. Fork length frequencies for white sucker from Rat and Threepoint lakes, 1989.

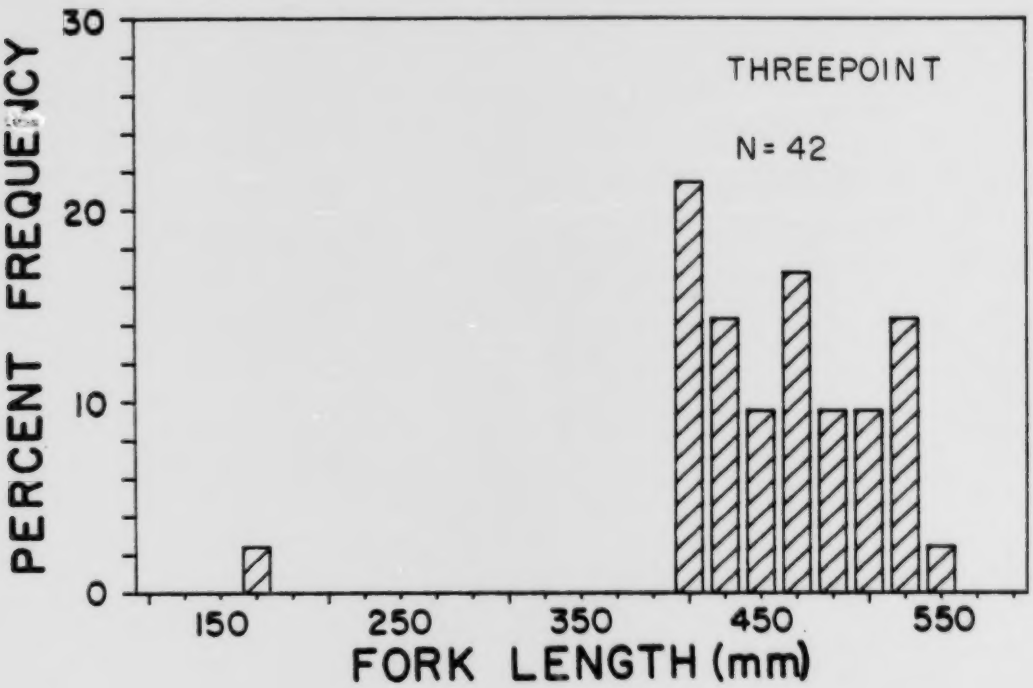

Fig. 18. Fork length frequencies for longnose sucker from Threepoint lake, 1989.

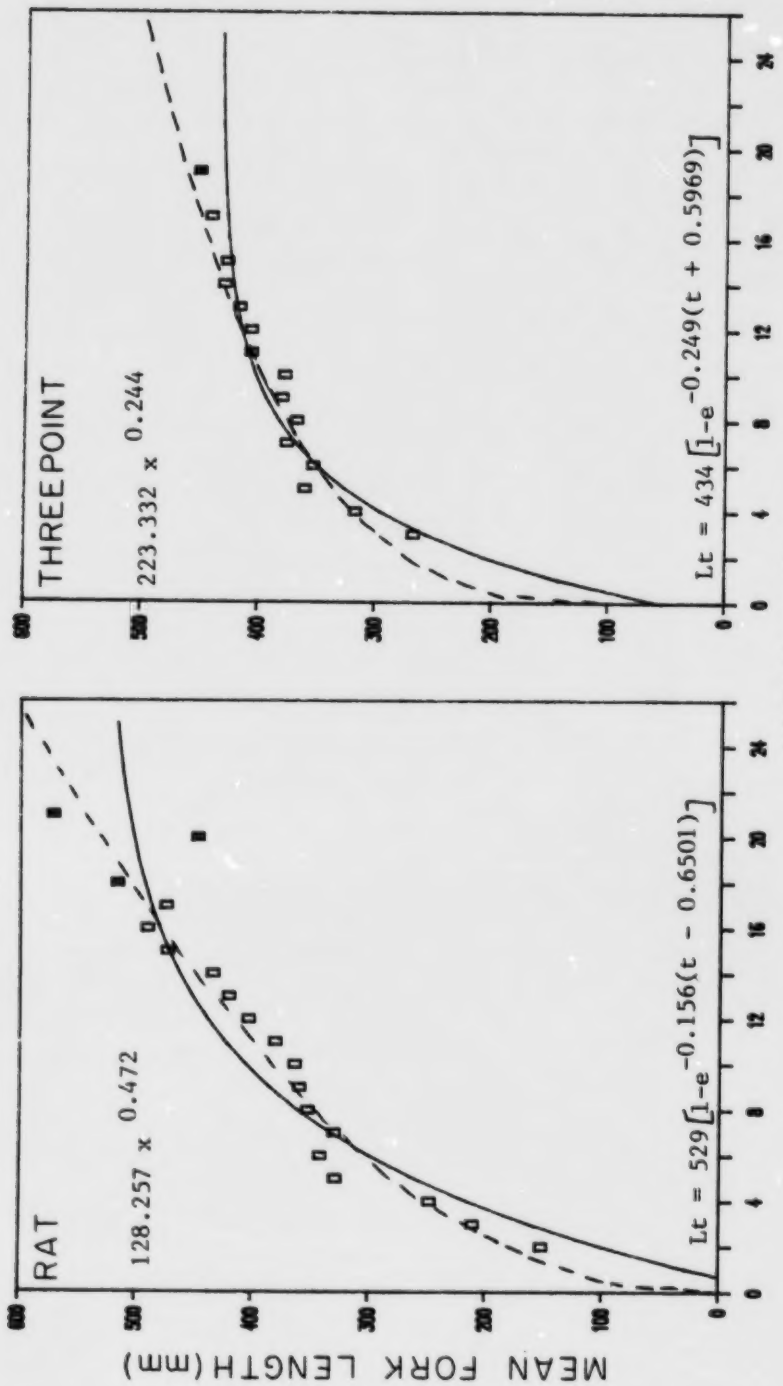

Fig. 19. Growth curves (___ = von Bertallanfy; --- = least squares regression power curve) for whitefish from Rat and Threepoint lakes, 1989.

■ = excluded from Walford and Brody analysis.

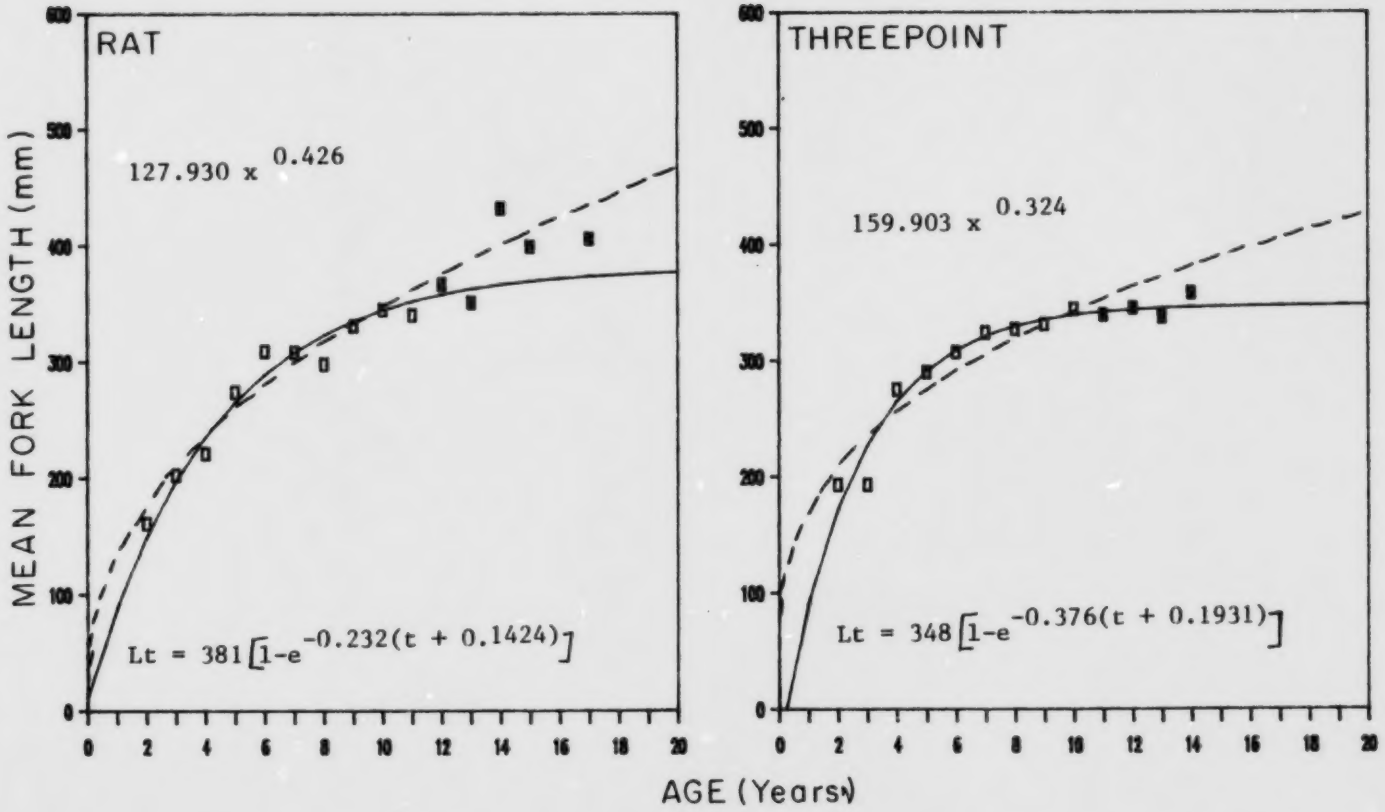

Fig. 20. Growth curves (___ = von Bertallanfy; --- - least squares regression power curve) for cisco from Rat and Threepoint lakes, 1989.

■ = excluded from Walford and Brody analysis.

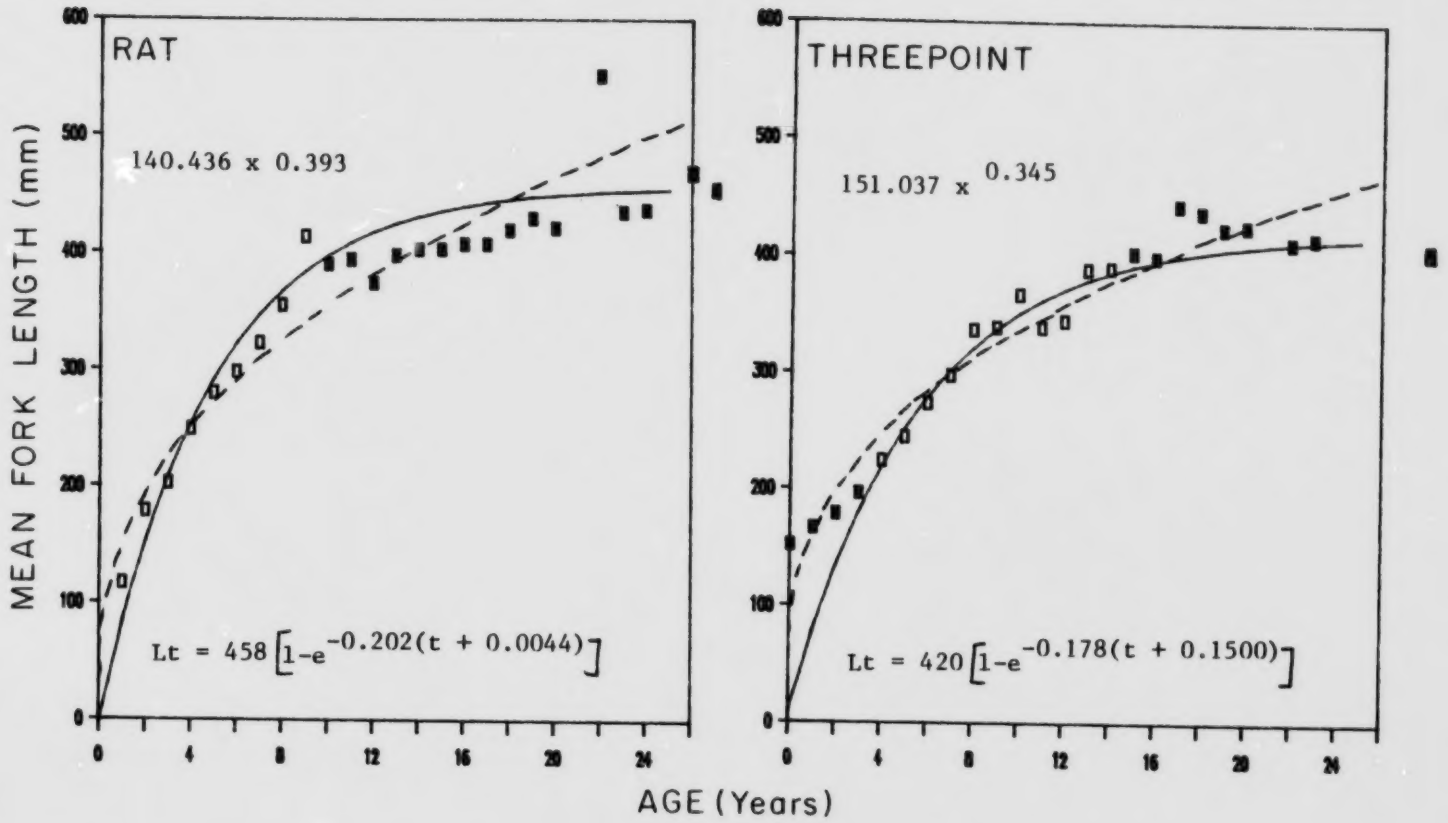

Fig. 21. Growth curves (___ = von Bertallanfy; --- = least squares regression power curve) for walleye from Rat and Threepoint lakes, 1989.

■ = excluded from Walford and Brody analysis.

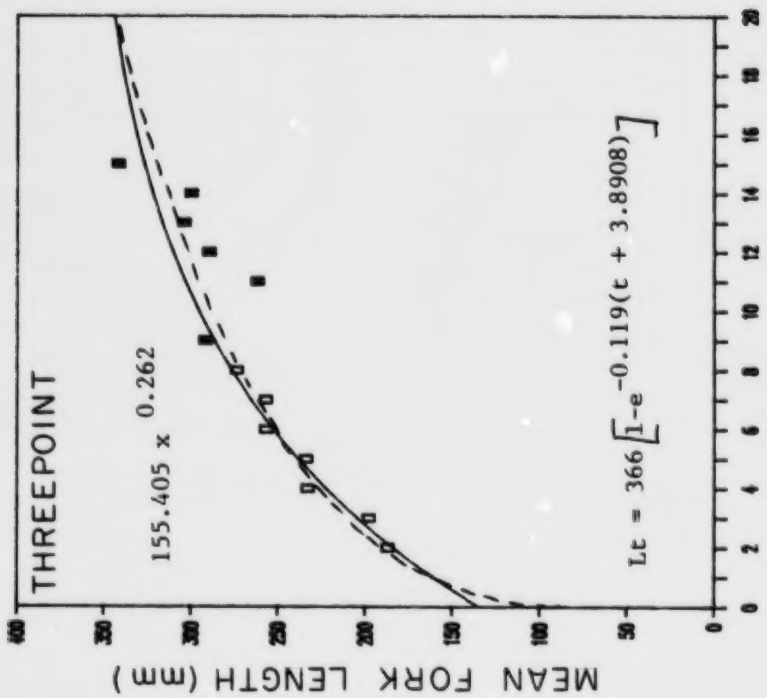

Fig. 22. Growth curves (____ = von Bertallanfy; --- = least squares regression power curve) for sauger from Threepoint Lake, 1989.

■ = excluded from Walford and Brody analysis.

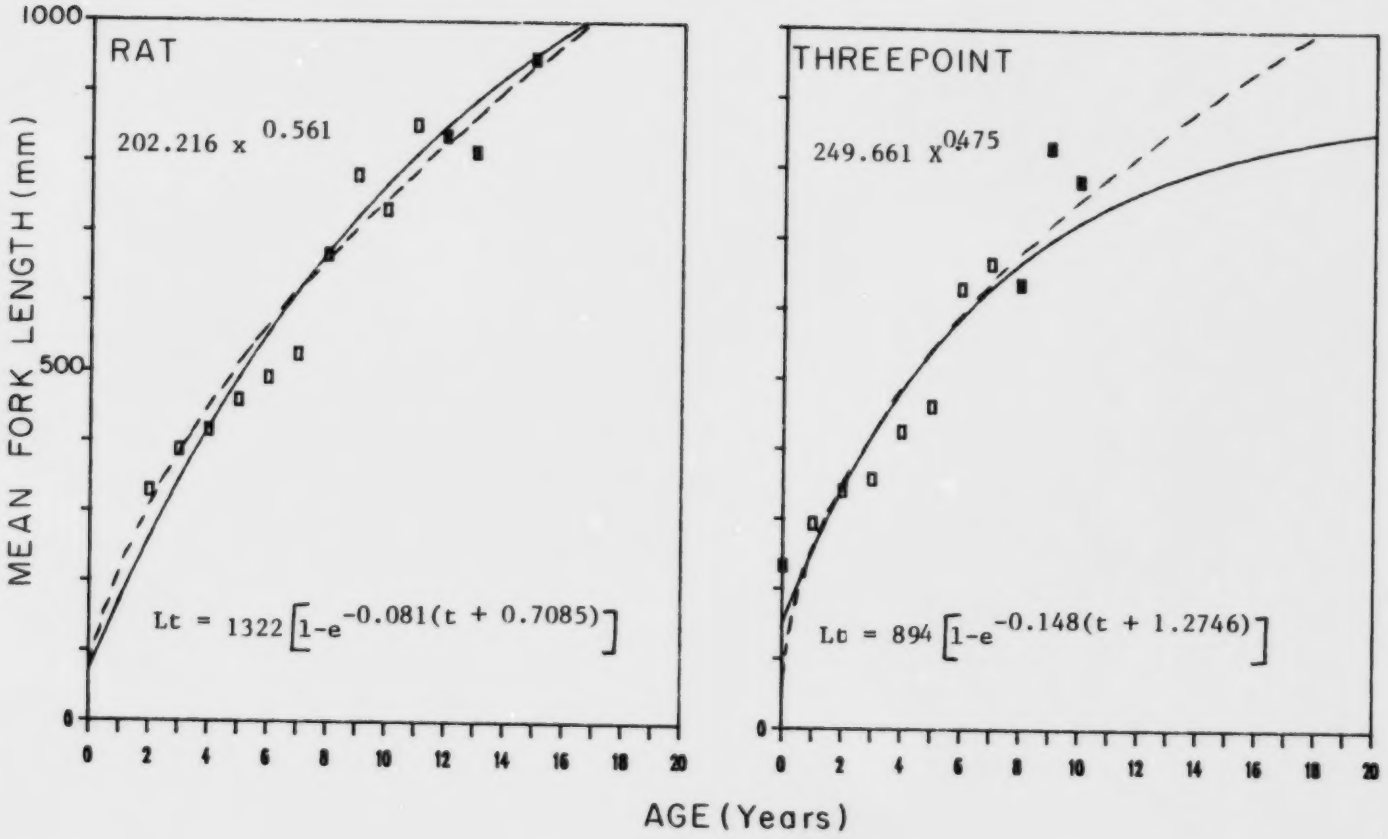

Fig. 23. Growth curves (___ = von Bertallanfy; --- = least squares regression power curve) for northern pike from Rat and Threepoint lakes, 1989.

■ = excluded from Walford and Brody analysis.

Table 1. Catch summary for fishing sets from Rat Lake, June 12 - June 30, 1989.

Set no.	Date of set	Whitefish	Cisco	Walleye	Sauger	Northern pike	White sucker	Longnose sucker	Yellow perch	Burbot	Total
1	June 12	6	3	8		4	4			1	26
2	"		7	18		7	4	1			37
3	June 13			2				1			3
4	"	1	2	9		1	3				16
5	June 14	40	4	1	2					2	49
6	"	21	1	2						1	25
7	June 15	7	3	1		1	1			1	14
8	"	11	12	13	10	1	1			3	51
9	June 16	9	4	8	1	10				2	34
10	"	8	3	3	1	8					23
11	June 17	15	7	4		2				1	29
12	"	148	3	2		2				7	162
13	June 18	4	12	29	3	4	4				56
14	"	3	2	6	1	1	1				14
15	June 26	6	2	15	1	5	5				34
16	"	5	2	23		8	2				40
17	June 27	4	13	15	5	4	1				42
18	"	5	2	5			3				15
19	June 28	17	3	21	1	6	3	2	1		54
20	"	13	22	7		3		2			47
21	June 29	59	4	11		4					78
22	"	42	3	36		12					93
23	June 30	5	4	1		1					11
24	"	10	40	19		1					70
	Total	439	158	259	25	85	32	6	1	18	1023

Table 2. Catch summary for fishing sets from Threepoint Lake, July 11 - August 11, 1989.

Set no.	Date of set	Whitefish	Cisco	Walleye	Sauger	Northern pike	White sucker	Longnose sucker	Shorthead redhorse sucker	Yellow perch	Burbot	Total
1	July 11	4	3	11	8	2	16	4		1		49
2	"	11	3	14	11	2	8	4	2	1		56
3	July 12	7	10	3	6	5	25	5			1	62
4	"	4	5	10	8		22					49
5	July 13	2	5	4	1	6	24	2			1	45
6	"	19	41	4	8	4	12	1		1	1	91
7	July 14	22	12	4	4	5	21				1	69
8	"	12	1	17	7	4	10	8		1		60
9	July 15	21	11	12	2	1	11	1				59
10	"	4	4	28	11	4	6	4		3		64
11	July 16	1	1	20	9	4	6	8		1		50
12	"	2		3	4	3	5	2				19
13	August 8	2	27	45	15	1	8					98
14	"	2	20	33	10	4	12					81
15	August 9	20	13	43	13	10	16	1				116
16	"	10	2	46	19	3	25					105
17	August 10	21	29	29	16		12					107
18	"	10	9	70	17	5	18	1		1	1	132
19	August 11	10	28	18	22	4	9	1				92
20	"	7	15	22	21	1	16					82
	Total	191	239	436	212	68	282	42	2	9	5	1486

Table 3. Catch per unit of effort (CUE) and percent frequency of occurrence for fish caught from Rat and Threepoint lakes, 1989. Number in parentheses are the number of standard gangs set in each lake.

Species	CUE (number/gang/day)		CUE (kg/gang/day)		% frequency of occurrence			
					Rat		Threepoint	
	Rat (24)	Threepoint (20)	Rat	Threepoint	No.	Wt.	No.	Wt.
Whitefish	18.3	9.6	18.2	8.9	42.9	50.4	13.6	19.7
Cisco	6.6	12.0	3.4	6.4	15.4	9.5	17.0	14.2
Walleye	10.8	21.8	6.0	7.7	25.3	16.7	31.1	17.1
Sauger	1.0	10.6	0.3	1.6	2.4	0.9	15.1	3.6
Northern pike	3.5	3.4	5.4	1.6	8.3	14.8	4.8	3.6
White sucker	1.3	14.1	1.5	15.4	3.1	4.2	20.1	34.1
Longnose sucker	0.3	2.1	0.5	3.1	0.6	1.3	3.0	6.9
Shorthead redhorse		0.1		0.1			0.1	0.3
Yellow perch	0.04	0.5	<.01	0.1	0.1	0.01	0.6	0.2
Burbot	0.8	0.3	0.8	0.2	1.8	2.2	0.4	0.4
Total	42.6	74.3	36.2	45.2	100.0	100.0	100.0	100.0

Table 4. Sum weights (kg) for fish caugth in 24 experimental fishing sets in Rat Lake, 1989.

Species	Parameter	Mesh size (inches)						
		1.5	2.0	3.0	3.75	4.25	5.0	Total
Whitefish	N	10	22	87	133	99	88	439
	weights	5.72	17.33	71.87	118.37	107.65	116.75	437.69
Cisco	N	15	31	47	32	24	9	158
	weights	5.29	10.64	23.95	18.01	16.68	7.73	82.30
Walleye	N	40	63	65	60	31		259
	weights	7.87	22.14	38.02	45.31	31.30		144.64
Sauger	N	6	10	9				25
	weights	1.48	2.55	3.71				7.73
Northern pike	N	8	17	38	12	8	2	85
	weights	10.81	10.34	46.85	31.68	22.86	6.34	128.88
White sucker	N		1	9	10	7	5	32
	weights		0.24	7.62	12.11	8.65	7.82	36.45
Longnose sucker	N			2		1	3	6
	weights			5.24		0.71	5.24	11.19
Yellow perch	N		1					1
	weights		0.10					0.10
Burbot	N		1	4	6	5	2	18
	weights		0.47	2.16	4.74	7.38	4.70	19.44
Total	N	79	146	261	253	175	109	1023
	weights	31.162	63.804	199.426	230.226	195.224	148.578	868.42

Table 5. Sum weights (kg) for fish caught in 20 experimental fishing sets in Threepoint Lake, 1989.

Species	Parameter	Mesh size (inches)						
		1.5	2.0	3.0	3.75	4.25	5.0	Total
Whitefish	N	2	5	19	51	67	47	191
	weights	2.86	4.24	13.58	40.11	63.63	54.08	178.51
Cisco	N	17	36	84	78	22	2	239
	weights	7.41	13.92	45.20	46.69	14.03	1.61	128.85
Walleye	N	145	99	98	67	17	10	436
	weights	16.70	21.12	53.50	46.97	11.73	4.29	154.31
Sauger	N	79	117	7	7	2		212
	weights	9.78	19.23	1.73	1.15	0.32		32.21
Northern pike	N	26	31	7	1	1	2	68
	weights	5.21	9.53	4.72	2.04	4.30	6.49	32.29
White sucker	N	5	14	56	121	73	13	282
	weights	3.81	9.41	52.88	134.57	89.23	19.03	308.93
Longnose sucker	N	1	2	3	9	8	19	42
	weights	0.08	1.90	2.74	10.35	12.11	35.07	62.25
Shorthead redhorse sucker	N				1		1	2
	weights				1.24		1.18	2.42
Yellow perch	N		5	3	1			9
	weights		0.64	0.70	0.25			1.60
Burbot	N			1	4			5
	weights			0.62	3.02			3.64
Total	N	275	309	278	340	190	94	1486
	weights	45.841	79.996	175.66	286.386	195.354	121.75	904.987

Table 6. Mesh size effects on whitefish catches from Rat Lake, 1989.

	Mesh size (inches)						
	1.50	2.00	3.00	3.75	4.25	5.00	Total
Number caught	10	22	87	133	99	88	439
CUE (No/100 yds/day)	1.67	3.67	14.50	22.17	16.50	14.67	12.19
CUE (Kg/100 yds/day)	0.95	2.89	11.98	19.73	17.94	19.46	12.16
Mean Length(mm)	268 ± 124.93	333 ± 113.96	358 ± 55.11	371 ± 41.52	396 ± 40.03	421 ± 48.20	380 ± 61.62
Mean Weight(g)	572 ± 721.48	788 ± 676.25	826 ± 444.97	890 ± 363.01	1087 ± 376.90	1327 ± 485.23	997 ± 478.59
No. mat. males		3	18	50	42	37	150
No. immat. males	5	7	17	28	14	7	78
No. mat. females	3	5	37	40	40	41	166
No. immat.females	2	7	15	15	3	3	45
% mature (both)	30.0	36.4	63.2	67.7	82.8	88.6	72.0
Unknown (sex & mat.)							
Mean age (Years)	5.3	7.9	10.0	10.4	11.3	12.2	10.6
Age(years)	Frequency (%)						
2	30.0						0.7
3	30.0	31.8	1.1				2.5
4		9.1	2.3				0.9
5	10.0			0.8			0.5
6			2.3	1.5			0.9
7		4.5	17.2	10.5	3.0		7.5
8		4.5	5.7	5.3	2.0	3.4	4.1
9	10.0	4.5	8.0	9.8	8.1	5.7	8.0
10		4.5	17.2	19.5	18.2	14.8	16.6
11			13.8	17.3	17.2	8.0	13.4
12	20.0	31.8	21.8	27.1	31.3	34.1	28.5
13		9.1	6.9	4.5	16.2	11.4	9.1
14			1.1	2.3	2.0	11.4	3.6
15			1.1	0.8	1.0	2.3	1.1
16					1.0	3.4	0.9
17						3.4	0.7
18			1.1			1.1	0.5
20				0.8			0.2
21						1.1	0.2

Total effort for each mesh size was 600 yards of net.
± = standard deviation

Table 7. Mesh size effects on whitefish catches from Threepoint Lake, 1989.

	Mesh size (inches)						
	1.50	2.00	3.00	3.75	4.25	5.00	Total
Number caught	2	5	19	51	67	47	191
CUE (No/100 yds/day)	0.40	1.00	3.80	10.20	13.40	9.40	6.37
CUE (Kg/100 yds/day)	0.57	0.85	2.72	8.02	12.73	10.82	5.95
Mean Length(mm)	450 ± 36.77	366 ± 87.42	357 ± 42.52	374 ± 29.42	395 ± 32.49	421 ± 27.59	392 ± 39.89
Mean Weight(g)	1430 ± 325.27	848 ± 407.37	715 ± 272.59	787 ± 201.41	950 ± 265.15	1151 ± 257.23	935 ± 295.51
No. mat. males	1	1	1	10	19	11	43
No. imm. males		2	6	14	14	6	42
No. mat. females	1	2	6	22	24	25	80
No. imm. females			6	5	10	5	26
% Mature	100.0	60.0	36.8	62.7	64.2	76.6	64.4
No. unknown							
Mean age (Years)	11.0	10.4	8.5	10.0	10.3	11.3	10.3
Age(years)	Frequency (%)						
3		20.0	5.3				1.0
4			10.5		1.5		1.6
5			10.5	3.9	1.5		2.6
6					4.5		1.6
7			10.5	7.8	3.0	4.3	5.2
8			10.5	17.6	10.4	4.3	10.5
9			15.8	9.8	16.4	10.6	12.6
10	50.0		5.3	13.7	11.9	2.1	9.4
11		20.0	10.5	13.7	13.4	25.5	16.2
12	50.0	40.0	5.3	23.5	22.4	38.3	25.7
13			15.8	9.8	10.4	8.5	9.9
14		20.0			3.0		1.6
15						4.3	1.0
17						2.1	0.5
19					1.5		0.5

Total effort for each mesh size was 500 yards of net.
± = standard deviation

Table 8. Mesh size effects on cisco catches from Rat Lake, 1989.

	Mesh size (inches)						
	1.50	2.00	3.00	3.75	4.25	5.00	Total
Number caught	15	31	47	32	24	9	158
CUE (No/100 yds/day)	2.50	5.17	7.83	5.33	4.00	1.50	4.39
CUE (Kg/100 yds/day)	0.88	1.77	3.99	3.00	2.78	1.29	2.29
Mean Length(mm)	255 ± 103.08	272 ± 54.91	313 ± 45.74	324 ± 33.02	351 ± 31.28	375 ± 27.29	311 ± 60.38
Mean Weight(g)	353 ± 384.98	343 ± 250.94	510 ± 216.38	563 ± 211.39	695 ± 191.37	859 ± 180.26	521 ± 274.47
No. mat. males	1	4	16	11	6	6	44
No. immat. males	6	9	5	5	6		31
No. mat. females	3	8	17	11	8	3	50
No. immat.females	5	10	9	5	4		33
% mature (both)	26.7	38.7	70.2	68.8	58.3	100.0	59.5
Unknown (sex & mat.)							
Mean age (Years)	6.5	6.2	8.3	8.4	9.6	10.7	8.1
Age(years)	Frequency (%)						
2	20.0						1.9
3	13.3	16.1					4.4
4	13.3	19.4	4.3				6.3
5	6.7	9.7	8.5	12.5	4.2		8.2
6	6.7	25.8	21.3	12.5	16.7	11.1	17.7
7	6.7	6.5	14.9	31.3	8.3		13.9
8		3.2	6.4	6.3	12.5	11.1	6.3
9			8.5		8.3		3.8
10	6.7	6.5	8.5	9.4	4.2	22.2	8.2
11	6.7	3.2	12.8	6.3	16.7	11.1	9.5
12	13.3	9.7	12.8	12.5	16.7	33.3	13.9
13			2.1	9.4	4.2		3.2
14					4.2		0.6
15	6.7					11.1	1.3
17					4.2		0.6

Total effort for each mesh size was 600 yards of net.
± = standard deviation

Table 9. Mesh size effects on cisco catches from Threepoint Lake, 1989.

	Mesh size (inches)						
	1.50	2.00	3.00	3.75	4.25	5.00	Total
Number caught	17	36	84	78	22	2	239
CUE (No/100 yds/day)	3.40	7.20	16.80	15.60	4.40	0.40	7.97
CUE (Kg/100 yds/day)	1.48	2.78	9.04	9.34	2.81	0.32	4.29
Mean Length(mm)	295 ± 63.16	285 ± 64.98	327 ± 29.43	336 ± 27.16	339 ± 15.05	358 ± 16.97	322 ± 42.64
Mean Weight(g)	436 ± 215.45	387 ± 231.64	538 ± 152.35	599 ± 180.32	638 ± 86.33	804 ± 234.76	539 ± 193.51
No. mat. males	2	6	16	16	5	1	46
No. imm. males	4	9	17	17	1		47
No. mat. females	9	8	33	29	14	1	94
No. imm. females	1	12	16	16	2		47
% Mature	68.8	40.0	59.8	57.7	86.4	100.0	59.6
No. unknown	1	1	2				4
Mean age (Years)	7.1	6.6	9.0	9.5	8.8	9.5	8.7
Age(years)	Frequency (%)						
2		11.4					1.7
3	18.8	8.6					2.6
4	6.3	8.6		1.3			2.1
5	12.5	11.4	8.5	3.8			6.8
6	18.8	14.3	11.0	3.8	13.6		9.8
7		11.4	7.3	17.9	18.2		11.9
8	12.5	5.7	18.3	10.3	9.1	50.0	12.8
9	6.3	2.9	6.1	7.7	13.6		6.7
10		8.6	17.1	11.5	22.7		13.2
11	6.3	5.7	17.1	17.9	22.7	50.0	15.7
12	12.5	11.4	13.4	19.2			13.6
13	6.3		1.2	5.1			2.6
14				1.3			0.4
Number of unknown ages	1	1	2				4

Total effort for each mesh size was 500 yards of net.
± = standard deviation

Table 10. Mesh size effects on walleye catches from Rat Lake, 1989.

	Mesh size (inches)						
	1.50	2.00	3.00	3.75	4.25	5.00	Total
Number caught	40	63	65	60	31		259
CUE (No/100 yds/day)	6.67	10.50	10.83	10.00	5.17		7.19
CUE (Kg/100 yds/day)	1.31	3.69	6.34	7.55	5.22		4.02
Mean Length(mm)	238 ± 82.41	308 ± 53.61	367 ± 57.59	399 ± 52.14	441 ± 33.26	375 ± 27.29	349 ± 85.49
Mean Weight(g)	197 ± 251.79	351 ± 191.08	585 ± 256.04	755 ± 247.23	1010 ± 250.25	859 ± 180.26	558 ± 346.80
No. mat. males	2	10	22	22	13		69
No. immat. males	28	25	14	6	1		74
No. mat. females	2	5	12	16	14		49
No. immat.females	8	23	17	16	3		67
% mature (both)	10.0	23.8	52.3	63.3	87.1		45.6
Unknown (sex & mat.)							
Mean age (Years)	4.4	7.9	11.2	13.1	16.5		10.4
Age(years)	Frequency (%)						
1		1.6	1.5	1.7			1.2
2	50.0						7.7
3	12.5	1.6					2.3
4		3.2					0.8
5	5.0	22.2	3.1				6.9
6	15.0	30.2	12.3			11.1	12.7
7	5.0	9.5	4.6				4.2
8		7.9	12.3	10.0	3.2	11.1	7.7
9	2.5	1.6	1.5	3.3	6.5		2.7
10		4.8	16.9	21.7		22.2	10.4
11	2.5		3.1	6.7		11.1	2.7
12			3.1	3.3		33.3	1.5
13	2.5	3.2	4.6	11.7	6.5		5.8
14	5.0	3.2	6.2	1.7	6.5		4.2
15			7.7	11.7	9.7	11.1	5.8
16		4.8	13.8	11.7	29.0		10.8
17		1.6	6.2	6.7	12.9		5.0
18				3.3	3.2		1.2
19		3.2	3.1		9.7		2.7
20				1.7			0.4
22					3.2		0.4
23		1.6		1.7			0.8
24				1.7			0.4
26				1.7	6.5		1.2
27					3.2		0.4

Total effort for each mesh size was 600 yards of net.
± = standard deviation

Table 11. Mesh size effects on walleye catches from Threepoint Lake, 1989.

	Mesh size (inches)						
	1.50	2.00	3.00	3.75	4.25	5.00	Total
Number caught	145	99	98	67	17	10	436
CUE (No/100 yds/day)	29.00	19.80	19.60	13.40	3.40	2.00	14.53
CUE (Kg/100 yds/day)	3.34	4.22	10.70	9.39	2.35	0.86	5.14
Mean Length(mm)	213 ± 50.05	263 ± 57.86	364 ± 62.67	389 ± 78.09	389 ± 76.27	293 ± 128.02	294 ± 95.70
Mean Weight(g)	115 ± 99.79	213 ± 168.99	546 ± 258.73	701 ± 296.42	690 ± 284.88	429 ± 516.41	354 ± 318.43
No. mat. males	3	4	10	10	2		29
No. imm. males	89	43	30	14	5	6	187
No. mat. females		3	18	28	6	1	56
No. imm. females	52	48	40	14	4	3	161
% Mature	2.1	7.1	28.6	57.6	47.1	10.0	19.6
No. unknown	1	1		1			3
Mean age (Years)	3.8	6.1	12.0	13.6	13.4	7.7	8.1
Age(years)	Frequency (%)						
0	0.7						0.2
1	4.1	1.0	1.0	1.5		10.0	2.3
2	47.6	11.1	2.0	7.5	5.9	30.0	20.9
3	9.7	7.1					4.8
4	4.1	3.0	1.0				2.3
5	7.6	19.2				10.0	7.1
6	15.9	34.3	6.1			10.0	14.7
7	3.4	5.1	3.1	1.5			3.2
8	4.1	5.1	12.2	6.0	11.8		6.7
9		2.0	8.2		5.9		2.5
10	0.7	2.0	8.2	10.4	11.8	10.0	4.8
11		1.0	3.1	1.5			1.1
12	0.7	3.0	3.1	1.5		10.0	2.1
13		2.0	11.2	11.9	11.8		5.3
14		1.0	8.2	9.0	5.9		3.7
15			11.2	6.0	5.9		3.7
16		2.0	9.2	17.9	5.9		5.5
17			4.1	3.0	5.9		1.6
18	0.7		4.1	3.0	17.6	10.0	2.5
19	0.7		2.0	11.9	11.8	10.0	3.2
20		1.0	1.0	4.5			1.1
22				1.5			0.2
23				1.5			0.2
28			1.0				0.2

Total effort for each mesh size was 500 yards of net.
± = standard deviation

Table 12. Mesh size effects on sauger catches from Rat Lake, 1989.

	Mesh size (inches)						
	1.50	2.00	3.00	3.75	4.25	5.00	Total
Number caught	6	10	9				25
CUE (No/100 yds/day)	1.00	1.67	1.50				0.69
CUE (Kg/100 yds/day)	0.25	0.42	0.62				0.21
Mean Length(mm)	288 ± 43.20	287 ± 51.35	345 ± 16.12	399 ± 52.14	441 ± 33.26	375 ± 27.29	308 ± 47.50
Mean Weight(g)	246 ± 122.39	255 ± 147.90	412 ± 64.24	755 ± 247.23	1010 ± 250.25	859 ± 180.26	309 ± 137.45
No. mat. males	1	4	3				8
No. immat. males	2	2					4
No. mat. females	1	2	6				9
No. immat.females	2	2					4
% mature (both)	33.3	60.0	100.0				68.0
Unknown (sex & mat.)							
Mean age (Years)	7.2	8.0	15.2				10.4
Age(years)	Frequency (%)						
4		10.0					4.0
5	33.3	50.0					28.0
6	50.0	10.0				11.1	16.0
12			11.1	3.3		33.3	4.0
13			11.1	11.7	6.5		4.0
14			11.1	1.7	6.5		4.0
15	16.7	30.0	22.2	11.7	9.7	11.1	24.0
16			33.3	11.7	29.0		12.0
20			11.1	1.7			4.0

Total effort for each mesh size was 600 yards of net.
± = standard deviation

Table 13. Mesh size effects on sauger catches from Threepoint Lake, 1989.

	Mesh size (inches)						
	1.50	2.00	3.00	3.75	4.25	5.00	Total
Number caught	79	117	7	7	2		212
CUE (No/100 yds/day)	15.80	23.40	1.40	1.40	0.40		7.07
CUE (Kg/100 yds/day)	1.96	3.85	0.35	0.23	0.06		1.07
Mean Length(mm)	232 ± 35.20	257 ± 26.00	293 ± 43.81	238 ± 68.13	255 ± 12.73		248 ± 34.90
Mean Weight(g)	124 ± 55.52	164 ± 49.73	247 ± 101.05	164 ± 104.45	159 ± 38.18		152 ± 61.63
No. mat. males		13	1	3			17
No. imm. males	39	38	2	2	1		82
No. mat. females	4	8	1	1			14
No. imm. females	36	57	3	1	1		98
% Mature	5.1	18.1	28.6	57.1			14.7
No. unknown		1					1
Mean age (Years)	5.3	6.7	9.4	6.1	6.5		6.3
Age(years)	Frequency (%)						
2	15.2	3.4		28.6			8.5
3	5.1	0.9					2.4
4	12.7	7.7	14.3	14.3			9.9
5	27.8	31.6	14.3				28.3
6	13.9	17.1		14.3	50.0		15.6
7	8.9	8.5			50.0		8.5
8	11.4	16.2	28.6	28.6			15.1
9		0.9					0.5
11		0.9					0.5
12	5.1	3.4					3.8
13		8.5	28.6	14.3			6.1
14		0.9					0.5
15			14.3				0.5

Total effort for each mesh size was 500 yards of net.
± = standard deviation

Table 14. Mesh size effects on northern pike from Rat Lake, 1989.

	Mesh size (inches)						
	1.50	2.00	3.00	3.75	4.25	5.00	Total
Number caught	8	17	38	12	8	2	85
CUE (No/100 yds/day)	1.33	2.83	6.33	2.00	1.33	0.33	2.36
CUE (Kg/100 yds/day)	1.80	1.72	7.81	5.28	3.81	1.06	3.58
Mean Length(mm)	507 ± 184.87	417 ± 98.05	518 ± 140.34	642 ± 212.12	683 ± 157.76	786 ± 8.49	536 ± 172.02
Mean Weight(g)	1351 ±1924.29	608 ± 748.86	1233 ±1389.51	2640 ±2427.20	2858 ±1724.25	3170 ± 523.26	1516 ±1706.17
No. mat. males	1	4	14	2	3		24
No. immat. males	1	3	12				16
No. mat. females	3	1	12	6	5	2	29
No. immat.females	3	9		4			16
% mature (both)	50.0	29.4	68.4	66.7	100.0	100.0	62.4
Unknown (sex & mat.)							
Mean age (Years)	5.9	4.4	5.8	8.1	8.5	12.0	6.3
Age(years)	Frequency (%)						
2		5.9					1.2
3	12.5	23.5	5.3				8.2
4	37.5	41.2	23.7	8.3			23.5
5	25.0	11.8	34.2	33.3	25.0		27.1
6		5.9	13.2	16.7	12.5		10.6
7		5.9	5.3				3.5
8					12.5		1.2
9			5.3		12.5		3.5
10	12.5	5.9	7.9		12.5		7.1
11			5.3	16.7			4.7
12	12.5			16.7	12.5	100.0	7.1
13					12.5		1.2
15				8.3			1.2

Total effort for each mesh size was 600 yards of net.
± = standard deviation

Table 15. Mesh size effects on northern pike from Threepoint Lake, 1989.

	Mesh size (inches)						
	1.50	2.00	3.00	3.75	4.25	5.00	Total
Number caught	26	31	7	1	1	2	68
CUE (No/100 yds/day)	5.20	6.20	1.40	0.20	0.20	0.40	2.27
CUE (Kg/100 yds/day)	1.04	1.91	0.94	0.41	0.86	1.30	1.08
Mean Length(mm)	316 ± 112.94	344 ± 68.22	431 ± 115.99	636 ± -	832 ± -	630 ± 376.18	362 ± 134.88
Mean Weight(g)	200 ± 111.30	308 ± 321.67	674 ± 661.52	2040 ± -	4300 ± -	3245 ±4122.43	475 ± 934.96
No. mat. males	1	4	1				6
No. imm. males	12	15				1	28
No. mat. females	1	2		1	1	1	6
No. imm. females	12	10	6				28
% Mature	7.7	19.4	14.3	100.0	100.0	50.0	17.6
No. unknown							
Mean age (Years)	1.9	1.9	3.1	8.0	9.0	3.0	2.3
Age(years)	Frequency (%)						
0	7.7						3.0
1	53.8	45.2	14.3				43.3
2	11.5	32.3	42.9				23.9
3	15.4	16.1				100.0	14.9
4	7.7		28.6				6.0
5		3.2					1.5
6		3.2					1.5
7			14.3				1.5
8				100.0			1.5
9					100.0		1.5
10	3.8						1.5
Number of unknown ages						1	1

Total effort for each mesh size was 500 yards of net.
± = standard deviation

Table 16. Mesh size effects on white sucker from Rat Lake, 1989.

	Mesh size (inches)						
	1.50	2.00	3.00	3.75	4.25	5.00	Total
Number caught		1	9	10	7	5	32
CUE (No/100 yds/day)		0.17	1.50	1.67	1.17	0.83	0.89
CUE (Kg/100 yds/day)		0.04	1.27	2.02	1.44	1.30	1.01
Mean Length(mm)		244 ± -	370 ± 33.67	414 ± 48.44	433 ± 19.07	449 ± 19.42	406 ± 52.91
Mean Weight(g)		240 ± -	847 ± 239.46	1211 ± 474.05	1236 ± 164.30	1564 ± 257.35	1139 ± 421.37
No. mat. males			3	3	4	1	11
No. immat. males			1		1		2
No. mat. females			3	7	2	3	15
No. immat.females		1	2			1	4
% mature (both)			66.7	100.0	85.7	80.0	81.3
Unknown (sex & mat.)							
Mean age (Years)		3.0	7.4	8.5	14.9	16.8	10.7
Age(years)				Frequency (%)			
3		100.0					3.1
5			22.2	10.0			9.4
6			33.3	30.0			18.8
7			11.1	20.0	14.3		12.5
8			22.2	20.0	14.3		15.6
14						20.0	3.1
15						20.0	3.1
16			11.1	20.0	28.6		15.6
17					28.6	20.0	9.4
18						20.0	3.1
20						20.0	3.1
23					14.3		3.1

Total effort for each mesh size was 600 yards of net.
± = standard deviation

Table 17. Mesh size effects on white sucker catches from Threepoint Lake, 1989.

	Mesh size (inches)						
	1.50	2.00	3.00	3.75	4.25	5.00	Total
Number caught	5	14	56	121	73	13	282
CUE (No/100 yds/day)	1.00	2.80	11.20	24.20	14.60	2.60	9.40
CUE (Kg/100 yds/day)	0.76	1.88	10.58	26.91	17.85	3.81	10.30
Mean Length(mm)	320 ± 142.60	330 ± 90.78	392 ± 43.13	417 ± 30.35	432 ± 29.40	459 ± 26.89	412 ± 49.64
Mean Weight(g)	762 ± 677.08	672 ± 429.20	944 ± 301.32	1112 ± 238.88	1222 ± 250.21	1464 ± 231.54	1095 ± 318.70
No. mat. males			8	11	8	2	29
No. imm. males	1	7	10	20	9	1	48
No. mat. females			3	22	20	1	46
No. imm. females			2.0	7.0	7	1	17
% Mature			47.8	55	63.6	60.0	53.6
No. unknown	4	7	33	61	29	8	42
Mean age (Years)	2.0	9.4	10.1	11.1	14.1	12.1	11.8
Age(years)	Frequency (%)						
2	100.0	14.3					1.4
3		14.3	4.5				1.4
4			4.5				0.7
5		14.3	9.1	5.1			4.3
6				10.2	2.4	14.3	5.8
7		14.3	22.7	6.8	2.4		8.0
8				3.4	2.4	14.3	2.9
9				6.8	2.4		1.8
10			4.5				0.7
11			22.7	20.3	7.1	14.3	15.2
12		14.3	13.6	15.3	14.3		13.8
13			4.5	1.7	19.0	28.6	8.7
14				11.9	7.1		7.2
15				10.2	7.1		6.5
16				5.1	9.5	14.3	5.8
17			4.5	1.7	7.1		3.6
18		14.3		1.7	11.9	14.3	5.8
19		14.3	4.5		2.4		2.2
20					2.4		0.7
21			4.5				0.7
22					2.4		0.7
Number of unknown ages	4	7	34	62	31	6	144

Total effort for each mesh size was 500 yards of net.
± = standard deviation

Table 18. Mesh size effects on longnose sucker catches from Rat Lake, 1989.

	Mesh size (inches)						
	1.50	2.00	3.00	3.75	4.25	5.00	Total
Number caught			2		1	3	6
CUE (No/100 yds/day)			0.33		0.17	0.50	0.17
CUE (Kg/100 yds/day)			0.87		0.12	0.87	0.31
Mean Length(mm)			517 ± 63.64		348 ± -	470 ± 26.15	465 ± 70.13
Mean Weight(g)			2620 ±1018.23		706 ± -	1747 ± 378.59	1864 ± 877.36
No. mat. males			1			2	3
No. immat. males					1		1
No. mat. females			1			1	2
No. immat.females							
% mature (both)			100.0			100.0	83.3
Unknown (sex & mat.)							
Mean age (Years)			12.5		6.0	9.0	9.7
Age(years)	Frequency (%)						
6					100.0		16.7
8						33.3	16.7
9			50.0			33.3	33.3
10						33.3	16.7
16			50.0				16.7

Total effort for each mesh size was 600 yards of net.
± = standard deviation

Table 19. Mesh size effects on longnose sucker catches from Threepoint Lake, 1989.

	Mesh size (inches)						
	1.50	2.00	3.00	3.75	4.25	5.00	Total
Number caught	1	2	3	9	8	19	42
CUE (No/100 yds/day)	0.20	0.40	0.60	1.80	1.60	3.80	1.40
CUE (Kg/100 yds/day)	0.02	0.38	0.55	2.07	2.42	7.01	2.08
Mean Length(mm)	178 ± -	410 ± 14.14	417 ± 11.72	434 ± 20.65	469 ± 51.64	492 ± 33.54	458 ± 62.23
Mean Weight(g)	82 ± -	950 ± 70.71	913 ± 100.66	1150 ± 188.94	1514 ± 401.39	1846 ± 405.34	1482 ± 527.46
No. mat. males		1			1	3	5
No. imm. males				1	1		2
No. mat. females		1	2	3	3	4	13
No. imm. females	1		1		1		3
% Mature		100.0	66.7	75.0	66.7	100.0	78.3
No. unknown				5	2	12	19
Mean age (Years)	2.0	9.0	9.0	8.8	14.0	15.6	12.1
Age(years)	Frequency (%)						
2	100.0						4.2
6				25.0			4.2
8		50.0	33.3		16.7		12.5
9			33.3	25.0	16.7	12.5	9.5
10		50.0	33.3	50.0	16.7		20.8
11						12.5	4.2
14						12.5	4.2
15						12.5	4.2
16					16.7	12.5	8.3
18					16.7	12.5	8.3
20						12.5	4.2
22						12.5	4.2
23					16.7		4.2
Number of unknown ages				5	2	11	18

Total effort for each mesh size was 500 yards of net.
± = standard deviation

Table 20. Mesh size effects on yellow perch and burbot catches from Rat Lake, 1989.

Species		Mesh size (inches)						
		1.50	2.00	3.00	3.75	4.25	5.00	Total
Yellow perch	Number caught		1					1
	CUE (No/100 yds/day)		0.17					0.03
	CUE (Kg/100 yds/day)		0.02					0.00
	Mean Length(mm)		190 ± -					190 ± -
	Mean Weight(g)		104 ± -					104 ± -
Burbot	Number caught		1	4	6	5	2	18
	CUE (No/100 yds/day)		0.17	0.67	1.00	0.83	0.33	0.50
	CUE (Kg/100 yds/day)		0.08	0.36	0.79	1.23	0.78	0.54
	Mean Length(mm)		410 ± -	414 ± 32.43	459 ± 40.31	578 ± 47.36	672 ± 70.71	503 ± 97.72
	Mean Weight(g)		466 ± -	540 ± 123.63	789 ± 191.10	1476 ± 459.38	2350 ±1032.38	1080 ± 694.55

Total effort for each mesh size was 600 yards of net.
± = standard deviation

Table 21. Mesh size effects on yellow perch and burbot catches from Threepoint Lake, 1989.

Species		Mesh size (inches)						
		1.50	2.00	3.00	3.75 /	4.25	5.00	Total
Yellow perch	Number caught		5	3	1			9
	CUE (No/100 yds/day)		1.00	0.60	0.20			0.30
	CUE (Kg/100 yds/day)		0.13	0.14	0.05			0.05
	Mean Length(mm)		196 ± 8.65	247 ± 6.43	240 ± -			218 ± 26.88
	Mean Weight(g)		129 ± 14.04	235 ± 7.57	250 ± -			178 ± 58.97
Burbot	Number caught			1	4			5
	CUE (No/100 yds/day)			0.20	0.80			0.17
	CUE (Kg/100 yds/day)			0.12	0.60			0.12
	Mean Length(mm)			442 ± -	479 ± -			471 ± 34.63
	Mean Weight(g)			618 ± -	755 ± -			728 ± 172.71

Total effort for each mesh was 500 yards of net.
± = standard deviation

Table 22. Age specific size and maturity conditions of whitefish from Rat Lake, 1989.

Sex	Age (Years)	Number	Maturity: Number Mature	Maturity: % Mature	Fl ± s.d. (mm)	Wt ± s.d. (g)	Mean Condition Factor
Males	2	2	0	0.0	146 ± 16.97	40 ± 11.31	1.27
	3	5	0	0.0	199 ± 12.46	92 ± 18.71	1.16
	4	1	0	0.0	260 ± -	244 ± -	1.39
	5	2	0	0.0	329 ± 1.41	520 ± 22.63	1.46
	6	2	0	0.0	353 ± 1.41	630 ± 28.28	1.43
	7	15	4	26.7	339 ± 29.88	652 ± 232.16	1.61
	8	11	4	36.4	337 ± 28.02	653 ± 180.09	1.67
	9	22	6	27.3	355 ± 41.45	752 ± 284.18	1.61
	10	38	22	57.9	364 ± 32.24	817 ± 213.50	1.67
	11	27	21	77.8	384 ± 29.21	953 ± 246.41	1.65
	12	67	58	86.6	400 ± 34.96	1127 ± 358.76	1.70
	13	19	18	94.7	417 ± 33.08	1274 ± 278.65	1.73
	14	8	8	100.0	451 ± 32.91	1590 ± 370.37	1.71
	15	4	4	100.0	466 ± 23.52	1835 ± 445.83	1.79
	16	2	2	100.0	471 ± 26.87	1810 ± 353.55	1.72
	17	1	1	100.0	450 ± -	1600 ± -	1.76
	20	1	1	100.0	448 ± -	1940 ± -	2.16
	21	1	1	100.0	572 ± -	3420 ± -	1.83
Total		228	150	65.8	379 ± 58.53	981 ± 455.64	1.66
Females	2	1	0	0.0	164 ± -	42 ± -	0.95
	3	6	0	0.0	221 ± 23.59	154 ± 53.39	1.37
	4	3	0	0.0	244 ± 32.19	192 ± 70.06	1.28
	6	2	0	0.0	331 ± 41.01	540 ± 206.48	1.45
	7	18	6	33.3	322 ± 34.17	532 ± 182.82	1.55
	8	7	6	85.7	379 ± 11.53	878 ± 131.84	1.61
	9	13	12	92.3	370 ± 37.97	852 ± 308.99	1.63
	10	35	28	80.0	363 ± 35.29	800 ± 216.92	1.64
	11	32	28	87.5	379 ± 47.01	960 ± 369.31	1.68
	12	58	51	87.9	408 ± 50.82	1244 ± 487.18	1.75
	13	21	20	95.2	424 ± 41.80	1342 ± 397.65	1.71
	14	8	8	100.0	419 ± 27.19	1406 ± 264.84	1.90
	15	1	1	100.0	506 ± -	2160 ± -	1.67
	16	2	2	100.0	511 ± 35.36	2075 ± 289.91	1.55
	17	2	2	100.0	487 ± 18.38	1970 ± 155.56	1.71
	18	2	2	100.0	517 ± 18.38	1990 ± 98.99	1.44
Total		211	166	78.7	381 ± 64.89	1014 ± 502.75	1.66
Both	2	3	0	0.0	152 ± 15.87	41 ± 8.08	1.17
	3	11	0	0.0	211 ± 21.88	126 ± 51.01	1.28
	4	4	0	0.0	248 ± 27.47	205 ± 62.83	1.31
	5	2	0	0.0	329 ± 1.41	520 ± 22.63	1.46
	6	4	0	0.0	342 ± 26.88	585 ± 131.06	1.44
	7	33	10	30.3	330 ± 33.06	587 ± 212.20	1.58
	8	18	10	55.6	353 ± 30.56	741 ± 194.78	1.65
	9	35	18	51.4	360 ± 40.32	789 ± 293.21	1.62
	10	73	50	68.5	364 ± 33.50	809 ± 213.81	1.66
	11	59	49	83.1	381 ± 39.62	957 ± 316.43	1.66
	12	125	109	87.2	404 ± 43.06	1181 ± 425.47	1.73
	13	40	38	95.0	421 ± 37.60	1310 ± 343.69	1.72
	14	16	16	100.0	435 ± 33.46	1498 ± 325.19	1.81
	15	5	5	100.0	474 ± 27.25	1900 ± 412.55	1.77
	16	4	4	100.0	491 ± 34.51	1943 ± 305.11	1.64
	17	3	3	100.0	475 ± 25.01	1847 ± 240.28	1.72
	18	2	2	100.0	517 ± 18.38	1990 ± 98.99	1.44
	20	1	1	100.0	448 ± -	1940 ± -	2.16
	21	1	1	100.0	572 ± -	3420 ± -	1.83
Total		439	316	72.0	380 ± 61.62	997 ± 478.59	1.66

Table 23. Age specific size and maturity conditions of whitefish from Threepoint Lake, 1989.

Sex	Age (Years)	Number	Maturity: Number Mature	Maturity: % Mature	Fl ± s.d. (mm)	Wt ± s.d. (g)	Mean Condition Factor
Males	3	1	0	0.0	212 ± -	132 ± -	1.39
	4	1	0	0.0	308 ± -	400 ± -	1.37
	5	3	3	100.0	385 ± 26.03	927 ± 161.66	1.61
	6	3	2	66.7	353 ± 13.32	717 ± 61.23	1.63
	7	4	2	50.0	391 ± 31.09	960 ± 251.19	1.57
	8	7	5	71.4	368 ± 43.61	756 ± 319.74	1.43
	9	11	5	45.5	372 ± 25.12	789 ± 189.92	1.51
	10	9	4	44.4	369 ± 18.36	773 ± 118.93	1.53
	11	11	4	36.4	395 ± 28.89	1007 ± 246.47	1.61
	12	18	9	50.0	411 ± 38.21	1105 ± 369.52	1.54
	13	12	6	50.0	418 ± 24.81	1043 ± 231.18	1.41
	14	3	1	33.3	430 ± 7.21	1103 ± 40.41	1.39
	17	1	1	100.0	442 ± -	1100 ± -	1.27
	19	1	1	100.0	452 ± -	1160 ± -	1.26
Total		85	43	50.6	391 ± 41.84	933 ± 298.92	1.51
Females	3	1	0	0.0	322 ± -	500 ± -	1.50
	4	2	0	0.0	322 ± 56.57	529 ± 323.85	1.47
	5	2	1	50.0	322 ± 39.60	505 ± 190.92	1.47
	7	6	5	83.3	366 ± 31.24	747 ± 241.86	1.48
	8	13	10	76.9	366 ± 33.38	794 ± 266.51	1.57
	9	13	11	84.6	386 ± 31.56	924 ± 266.94	1.55
	10	9	8	88.9	386 ± 27.00	852 ± 182.47	1.46
	11	20	16	80.0	413 ± 36.84	1124 ± 329.54	1.55
	12	31	23	74.2	404 ± 25.22	975 ± 235.90	1.45
	13	7	4	57.1	417 ± 39.12	1026 ± 282.36	1.38
	15	2	2	100.0	428 ± 33.94	1135 ± 374.77	1.42
Total		106	80	75.5	393 ± 38.43	936 ± 294.17	1.50
Both	3	2	0	0.0	267 ± 77.78	316 ± 260.22	1.44
	4	3	0	0.0	317 ± 40.81	486 ± 240.81	1.43
	5	5	4	80.0	360 ± 43.98	758 ± 274.81	1.56
	6	3	2	66.7	353 ± 13.32	717 ± 61.23	1.63
	7	10	7	70.0	376 ± 32.11	832 ± 256.07	1.52
	8	20	15	75.0	367 ± 36.14	781 ± 278.35	1.52
	9	24	16	66.7	380 ± 29.10	862 ± 239.92	1.53
	10	18	12	66.7	378 ± 24.06	813 ± 154.86	1.49
	11	31	20	64.5	407 ± 34.86	1083 ± 303.76	1.57
	12	49	32	65.3	407 ± 30.43	1023 ± 295.25	1.48
	13	19	10	52.6	417 ± 29.77	1037 ± 243.54	1.40
	14	3	1	33.3	430 ± 7.21	1103 ± 40.41	1.39
	15	2	2	100.0	428 ± 33.94	1135 ± 374.77	1.42
	17	1	1	100.0	442 ± -	1100 ± -	1.27
	19	1	1	100.0	452 ± -	1160 ± -	1.26
Total		191	123	64.4	392 ± 39.89	935 ± 295.51	1.50

± = standard deviation

Table 24. Age specific size and maturity conditions of cisco from Rat Lake, 1989.

Sex	Age (Years)	Number	Maturity: Number Mature	Maturity: % Mature	Fl ± s.d. (mm)	Wt ± s.d. (g)	Mean Condition Factor
Males	2	2	0	0.0	155 ± 32.53	45 ± 26.87	1.13
	3	3	0	0.0	186 ± 27.50	82 ± 24.98	1.27
	4	4	0	0.0	240 ± 32.70	211 ± 89.40	1.44
	5	5	2	40.0	248 ± 62.57	278 ± 156.43	1.51
	6	15	9	60.0	308 ± 31.66	479 ± 168.64	1.58
	7	10	3	30.0	315 ± 25.51	510 ± 122.06	1.61
	8	5	4	80.0	304 ± 13.37	458 ± 93.03	1.62
	9	3	2	66.7	302 ± 32.74	421 ± 137.70	1.49
	10	7	6	85.7	341 ± 42.37	680 ± 258.97	1.64
	11	9	7	77.8	336 ± 24.92	615 ± 145.47	1.59
	12	10	9	90.0	353 ± 29.65	724 ± 193.70	1.62
	13	1	1	100.0	336 ± -	520 ± -	1.37
	15	1	1	100.0	390 ± -	940 ± -	1.58
Total		75	44	58.7	306 ± 56.80	499 ± 239.25	1.55
Females	2	1	0	0.0	172 ± -	54 ± -	1.06
	3	4	0	0.0	215 ± 10.89	125 ± 26.05	1.24
	4	6	1	16.7	209 ± 44.50	145 ± 99.33	1.32
	5	8	4	50.0	291 ± 22.60	396 ± 85.75	1.59
	6	13	8	61.5	310 ± 40.32	488 ± 233.49	1.53
	7	12	8	66.7	303 ± 42.79	468 ± 219.05	1.55
	8	5	5	100.0	292 ± 46.23	397 ± 196.13	1.43
	9	3	2	66.7	361 ± 15.53	745 ± 160.52	1.57
	10	6	2	33.3	349 ± 35.75	654 ± 271.26	1.46
	11	6	6	100.0	346 ± 36.09	665 ± 220.05	1.56
	12	12	7	58.3	378 ± 23.03	803 ± 153.54	1.48
	13	4	4	100.0	355 ± 49.19	803 ± 381.76	1.72
	14	1	1	100.0	432 ± -	1300 ± -	1.61
	15	1	1	100.0	408 ± -	1140 ± -	1.68
	17	1	1	100.0	406 ± -	940 ± -	1.40
Total		83	50	60.2	316 ± 63.44	541 ± 302.86	1.50
Both	2	3	0	0.0	161 ± 25.01	48 ± 19.70	1.11
	3	7	0	0.0	203 ± 23.49	107 ± 32.80	1.25
	4	10	1	10.0	221 ± 41.45	171 ± 96.38	1.36
	5	13	6	46.2	274 ± 45.42	350 ± 126.53	1.56
	6	28	17	60.7	309 ± 35.25	484 ± 197.48	1.56
	7	22	11	50.0	308 ± 35.71	487 ± 178.82	1.58
	8	10	9	90.0	298 ± 32.62	427 ± 148.22	1.52
	9	6	4	66.7	331 ± 39.47	583 ± 221.93	1.53
	10	13	8	61.5	345 ± 38.04	668 ± 253.74	1.56
	11	15	13	86.7	340 ± 29.04	635 ± 173.27	1.58
	12	22	16	72.7	367 ± 28.62	767 ± 173.29	1.54
	13	5	5	100.0	351 ± 43.40	746 ± 353.93	1.65
	14	1	1	100.0	432 ± -	1300 ± -	1.61
	15	2	2	100.0	399 ± 12.73	1040 ± 141.42	1.63
	17	1	1	100.0	406 ± -	940 ± -	1.40
Total		158	94	59.5	311 ± 60.38	521 ± 274.47	1.53

± = standard deviation

Table 25. Age specific size and maturity conditions of cisco from Threepoint Lake, 1989.

Sex	Age (Years)	Number	Maturity: Number Mature	Maturity: % Mature	Fl ± s.d. (mm)	Wt ± s.d. (g)	Mean Condition Factor
Males	2	4	1	25.0	193 ± 19.49	97 ± 35.38	1.31
	3	2	0	0.0	212 ± 14.14	121 ± 26.87	1.26
	4	2	1	50.0	275 ± 49.50	350 ± 214.96	1.56
	5	8	2	25.0	287 ± 4.90	372 ± 42.53	1.58
	6	12	5	41.7	293 ± 52.44	421 ± 182.98	1.50
	7	13	4	30.8	325 ± 30.13	523 ± 149.76	1.52
	8	15	11	73.3	319 ± 32.33	506 ± 165.82	1.51
	9	5	4	80.0	329 ± 6.72	566 ± 70.56	1.59
	10	9	7	77.8	346 ± 28.41	697 ± 182.05	1.65
	11	14	8	57.1	342 ± 21.03	641 ± 145.33	1.59
	12	9	3	33.3	344 ± 36.60	640 ± 266.36	1.50
	13	1	0	0.0	290 ± -	380 ± -	1.56
Total		94	46	48.9	314 ± 47.34	510 ± 213.51	1.53
Females	3	4	3	75.0	184 ± 53.59	98 ± 107.76	1.18
	4	3	2	66.7	275 ± 36.02	316 ± 145.55	1.46
	5	8	4	50.0	292 ± 46.91	422 ± 239.34	1.52
	6	11	7	63.6	324 ± 30.83	490 ± 87.19	1.49
	7	15	10	66.7	324 ± 18.71	517 ± 115.80	1.51
	8	15	12	80.0	335 ± 16.19	597 ± 116.40	1.58
	9	11	8	72.7	332 ± 29.48	598 ± 221.06	1.59
	10	22	16	72.7	343 ± 18.06	648 ± 151.06	1.58
	11	23	15	65.2	337 ± 21.01	611 ± 141.35	1.56
	12	23	14	60.9	346 ± 21.91	586 ± 101.22	1.43
	13	5	3	60.0	346 ± 42.73	633 ± 262.64	1.47
	14	1	0	0.0	358 ± -	550 ± -	1.20
Total		141	94	66.7	329 ± 38.53	560 ± 177.72	1.52
Both	2	4	1	25.0	193 ± 19.49	97 ± 35.38	1.31
	3	6	3	50.0	193 ± 44.41	105 ± 85.20	1.21
	4	5	3	60.0	275 ± 35.51	330 ± 149.97	1.50
	5	16	6	37.5	290 ± 32.33	397 ± 168.02	1.55
	6	23	12	52.2	307 ± 45.38	454 ± 146.40	1.50
	7	28	14	50.0	324 ± 24.19	519 ± 130.12	1.52
	8	30	23	76.7	327 ± 26.43	552 ± 148.27	1.55
	9	16	12	75.0	331 ± 24.37	588 ± 184.76	1.59
	10	31	23	74.2	344 ± 21.10	662 ± 159.12	1.60
	11	37	23	62.2	339 ± 20.84	623 ± 141.62	1.58
	12	32	17	53.1	345 ± 26.21	601 ± 161.81	1.45
	13	6	3	50.0	337 ± 44.54	591 ± 256.65	1.49
	14	1	0	0.0	358 ± -	550 ± -	1.20
Total		235	140	59.6	323 ± 42.82	540 ± 193.91	1.52

± = standard deviation

Number of fish with unknown age, sex and maturity that were excluded = 4

Table 26. Age specific size and maturity conditions of walleye from Rat Lake, 1989.

Sex	Age (Years)	Number	Maturity: Number Mature	Maturity: % Mature	Fl ± s.d. (mm)	Wt ± s.d. (g)	Mean Condition Factor
	1	3	0	0.0	117 ± 8.08	16 ± 3.46	0.98
Males	2	18	0	0.0	176 ± 9.04	50 ± 8.07	0.92
	3	3	0	0.0	201 ± 14.47	81 ± 22.48	0.98
	4	1	0	0.0	242 ± -	136 ± -	0.96
	5	10	1	10.0	283 ± 40.09	246 ± 115.16	1.02
	6	22	2	9.1	292 ± 21.12	275 ± 64.91	1.08
	7	9	3	33.3	323 ± 33.93	361 ± 113.64	1.04
	8	6	3	50.0	361 ± 22.58	522 ± 106.98	1.10
	9	4	4	100.0	402 ± 24.49	751 ± 185.65	1.14
	10	12	7	58.3	385 ± 27.46	640 ± 141.09	1.10
	11	4	2	50.0	390 ± 31.41	679 ± 179.28	1.12
	13	6	5	83.3	373 ± 33.84	599 ± 153.65	1.14
	14	4	4	100.0	367 ± 44.38	623 ± 309.02	1.19
	15	6	6	100.0	363 ± 31.66	552 ± 136.32	1.13
	16	16	15	93.8	391 ± 42.67	713 ± 263.69	1.14
	17	6	6	100.0	390 ± 29.30	661 ± 137.65	1.11
	18	2	2	100.0	412 ± 22.63	800 ± 141.42	1.14
	19	3	2	66.7	406 ± 56.32	826 ± 373.95	1.18
	20	1	1	100.0	422 ± -	860 ± -	1.14
	23	2	1	50.0	436 ± 65.05	1040 ± 480.83	1.21
	24	1	1	100.0	438 ± -	950 ± -	1.13
	26	3	3	100.0	467 ± 43.92	1203 ± 343.56	1.16
	27	1	1	100.0	452 ± -	890 ± -	0.96
Total		143	69	48.3	326 ± 88.55	467 ± 321.27	1.08
Females	2	2	0	0.0	210 ± 45.25	97 ± 60.81	0.97
	3	3	0	0.0	204 ± 13.11	79 ± 20.13	0.92
	4	1	0	0.0	256 ± -	180 ± -	1.07
	5	8	0	0.0	277 ± 23.20	235 ± 76.67	1.08
	6	11	0	0.0	309 ± 20.94	323 ± 67.37	1.08
	7	2	0	0.0	322 ± 39.60	355 ± 120.21	1.04
	8	14	0	0.0	353 ± 44.06	520 ± 237.72	1.12
	9	3	1	33.3	429 ± 64.38	880 ± 405.94	1.06
	10	15	4	26.7	393 ± 26.71	700 ± 143.16	1.14
	11	3	1	33.3	399 ± 20.82	727 ± 125.86	1.13
	12	4	1	25.0	374 ± 23.52	584 ± 109.23	1.12
	13	9	5	55.6	416 ± 31.54	895 ± 234.66	1.22
	14	7	6	85.7	423 ± 47.31	867 ± 304.63	1.10
	15	9	9	100.0	429 ± 36.95	885 ± 231.30	1.09
	16	12	11	91.7	431 ± 41.21	935 ± 247.99	1.15
	17	7	5	71.4	423 ± 36.40	867 ± 235.91	1.12
	18	1	1	100.0	436 ± -	960 ± -	1.16
	19	4	4	100.0	449 ± 33.56	965 ± 165.43	1.06
	22	1	1	100.0	552 ± -	1900 ± -	1.13
Total		116	49	42.2	378 ± 72.11	671 ± 345.54	1.11
	1	3	0	0.0	117 ± 8.08	16 ± 3.46	0.98
Both	2	20	0	0.0	179 ± 17.12	55 ± 21.48	0.93
	3	6	0	0.0	203 ± 12.44	80 ± 19.12	0.95
	4	2	0	0.0	249 ± 9.90	158 ± 31.11	1.02
	5	18	1	5.6	280 ± 32.92	241 ± 97.32	1.05
	6	33	2	6.1	298 ± 22.13	291 ± 68.51	1.08
	7	11	3	27.3	323 ± 32.83	360 ± 108.55	1.04
	8	20	3	15.0	355 ± 38.43	521 ± 204.15	1.12
	9	7	5	71.4	414 ± 43.53	806 ± 277.40	1.11
	10	27	11	40.7	390 ± 26.83	673 ± 142.80	1.13
	11	7	3	42.9	394 ± 25.74	699 ± 148.44	1.13
	12	4	1	25.0	374 ± 23.52	584 ± 109.23	1.12
	13	15	10	66.7	398 ± 38.08	777 ± 250.06	1.19
	14	11	10	90.9	403 ± 52.31	778 ± 315.59	1.13
	15	15	15	100.0	403 ± 47.52	752 ± 256.32	1.11
	16	28	26	92.9	408 ± 45.91	808 ± 276.10	1.15
	17	13	11	84.6	408 ± 36.43	772 ± 217.01	1.11
	18	3	3	100.0	420 ± 21.17	853 ± 136.14	1.14
	19	7	6	85.7	430 ± 46.22	905 ± 256.55	1.11
	20	1	1	100.0	422 ± -	860 ± -	1.14
	22	1	1	100.0	552 ± -	1900 ± -	1.13
	23	2	1	50.0	436 ± 65.05	1040 ± 480.83	1.21
	24	1	1	100.0	438 ± -	950 ± -	1.13
	26	3	3	100.0	467 ± 43.92	1203 ± 343.56	1.16
	27	1	1	100.0	452 ± -	890 ± -	0.96
Total		259	118	45.6	349 ± 85.49	558 ± 346.80	1.09

Table 27. Age specific size and maturity conditions of walleye from Threepoint Lake, 1989.

Sex	Age (Years)	Number	Maturity: Number Mature	Maturity: % Mature	Fl ± s.d. (mm)	Wt ± s.d. (g)	Mean Condition Factor
	1	5	0	0.0	157 ± 19.83	46 ± 14.59	1.16
Males	2	58	0	0.0	178 ± 11.80	58 ± 11.73	1.02
	3	15	0	0.0	197 ± 17.93	79 ± 18.68	1.03
	4	5	0	0.0	222 ± 14.93	111 ± 12.62	1.02
	5	21	2	9.5	242 ± 12.14	139 ± 28.11	0.98
	6	31	2	6.5	268 ± 20.87	203 ± 53.96	1.04
	7	7	0	0.0	277 ± 28.04	223 ± 70.13	1.02
	8	10	3	30.0	297 ± 48.42	279 ± 171.33	0.95
	9	4	0	0.0	333 ± 26.80	399 ± 79.32	1.08
	10	5	0	0.0	351 ± 25.91	451 ± 144.31	1.02
	11	2	1	50.0	311 ± 15.56	296 ± 48.08	0.98
	12	3	1	33.3	343 ± 59.81	471 ± 259.54	1.07
	13	9	3	33.3	365 ± 30.03	535 ± 153.42	1.08
	14	5	1	20.0	392 ± 11.52	668 ± 90.70	1.11
	15	8	2	25.0	377 ± 30.02	584 ± 154.92	1.03
	16	9	5	55.6	384 ± 29.48	634 ± 157.77	1.10
	17	1	0	0.0	426 ± -	930 ± -	1.20
	18	2	2	100.0	398 ± 11.31	670 ± 70.71	1.06
	19	10	4	40.0	402 ± 23.31	710 ± 129.05	1.09
	20	3	1	33.3	404 ± 7.21	701 ± 103.25	1.06
	22	1	0	0.0	412 ± -	800 ± -	1.14
	23	1	1	100.0	416 ± -	760 ± -	1.06
	28	1	1	100.0	402 ± -	788 ± -	1.21
Total		216	29	13.4	267 ± 84.61	264 ± 247.33	1.03
	0	1	0	0.0	152 ± -	40 ± -	1.14
	1	4	0	0.0	179 ± 42.13	59 ± 44.26	0.93
Females	2	31	0	0.0	181 ± 11.93	63 ± 11.55	1.06
	3	6	0	0.0	198 ± 14.83	76 ± 16.59	0.96
	4	5	0	0.0	227 ± 20.18	120 ± 34.53	1.00
	5	10	0	0.0	252 ± 25.53	160 ± 62.42	0.95
	6	33	0	0.0	280 ± 30.03	230 ± 75.43	1.01
	7	7	1	14.3	319 ± 31.19	339 ± 123.94	1.01
	8	19	3	15.8	359 ± 38.80	500 ± 166.85	1.04
	9	7	0	0.0	342 ± 37.95	400 ± 118.25	0.99
	10	16	6	37.5	372 ± 35.49	576 ± 160.17	1.09
	11	3	1	33.3	357 ± 81.03	551 ± 370.00	1.09
	12	6	0	0.0	346 ± 47.62	456 ± 185.64	1.06
	13	14	8	57.1	405 ± 51.63	702 ± 229.83	1.04
	14	11	5	45.5	389 ± 43.07	635 ± 224.66	1.05
	15	8	6	75.0	430 ± 48.38	874 ± 299.92	1.06
	16	15	11	73.3	408 ± 42.63	768 ± 243.76	1.10
	17	6	4	66.7	447 ± 42.31	959 ± 285.86	1.05
	18	9	7	77.8	447 ± 55.48	964 ± 390.59	1.03
	19	4	2	50.0	480 ± 37.70	1193 ± 299.49	1.06
	20	2	2	100.0	460 ± 45.25	973 ± 321.03	0.98
Total		217	56	25.8	323 ± 97.12	448 ± 353.48	1.04
	0	1	0	0.0	152 ± -	40 ± -	1.14
	1	9	0	0.0	167 ± 31.53	52 ± 29.75	1.06
Both	2	89	0	0.0	179 ± 11.86	59 ± 11.86	1.03
	3	21	0	0.0	197 ± 16.75	78 ± 17.76	1.01
	4	10	0	0.0	225 ± 16.92	116 ± 24.94	1.01
	5	31	2	6.5	245 ± 17.87	146 ± 42.29	0.97
	6	64	2	3.1	274 ± 26.60	217 ± 66.80	1.02
	7	14	1	7.1	298 ± 35.60	281 ± 113.71	1.01
	8	29	6	20.7	337 ± 51.12	424 ± 196.79	1.01
	9	11	0	0.0	339 ± 33.23	400 ± 101.38	1.02
	10	21	6	28.6	367 ± 34.17	546 ± 162.51	1.07
	11	5	2	40.0	339 ± 63.14	449 ± 297.46	1.05
	12	9	1	11.1	345 ± 48.11	461 ± 196.04	1.06
	13	23	11	47.8	389 ± 47.96	637 ± 216.22	1.05
	14	16	6	37.5	390 ± 35.69	646 ± 189.96	1.07
	15	16	8	50.0	403 ± 47.71	719 ± 280.79	1.05
	16	24	16	66.7	399 ± 39.38	718 ± 221.84	1.10
	17	7	4	57.1	444 ± 39.45	955 ± 261.19	1.07
	18	11	9	81.8	438 ± 53.57	910 ± 369.69	1.03
	19	14	6	42.9	424 ± 45.26	848 ± 288.78	1.08
	20	5	3	60.0	426 ± 38.46	810 ± 230.73	1.03
	22	1	0	0.0	412 ± -	800 ± -	1.14
	23	1	1	100.0	416 ± -	760 ± -	1.06
	28	1	1	100.0	402 ± -	788 ± -	1.21
Total		433	85	19.6	295 ± 95.34	356 ± 318.50	1.04

± = standard deviation

Number of fish with unknown sex and mat that were excluded = 3

Table 28. Age specific size and maturity conditions of sauger from Rat Lake, 1989.

Sex	Age (Years)	Number	Maturity: Number Mature	Maturity: % Mature	Fl ± (mm)	s.d.	Wt ± (g)	s.d.	Mean Condition Factor
Males	4	1	1	100.0	246 ±	-	140 ±	-	0.94
	5	6	3	50.0	256 ±	24.90	167 ±	61.33	0.96
	6	1	0	0.0	272 ±	-	168 ±	-	0.83
	14	1	1	100.0	344 ±	-	380 ±	-	0.93
	15	1	1	100.0	348 ±	-	390 ±	-	0.93
	16	2	2	100.0	335 ±	4.24	372 ±	16.97	0.99
Total		12	8	66.7	285 ±	44.91	235 ±	114.10	0.95
Females	5	1	0	0.0	258 ±	-	172 ±	-	1.00
	6	3	0	0.0	283 ±	12.86	247 ±	47.93	1.07
	12	1	1	100.0	322 ±	-	340 ±	-	1.02
	13	1	1	100.0	362 ±	-	484 ±	-	1.02
	15	5	5	100.0	351 ±	20.52	437 ±	81.98	1.00
	16	1	1	100.0	366 ±	-	480 ±	-	0.98
	20	1	1	100.0	366 ±	-	510 ±	-	1.04
Total		13	9	69.2	329 ±	40.47	378 ±	123.64	1.02
Both	4	1	1	100.0	246 ±	-	140 ±	-	0.94
	5	7	3	42.9	257 ±	22.74	167 ±	56.02	0.96
	6	4	0	0.0	281 ±	11.93	227 ±	55.49	1.01
	12	1	1	100.0	322 ±	-	340 ±	-	1.02
	13	1	1	100.0	362 ±	-	484 ±	-	1.02
	14	1	1	100.0	344 ±	-	380 ±	-	0.93
	15	6	6	100.0	351 ±	18.40	429 ±	75.78	0.99
	16	3	3	100.0	345 ±	18.15	408 ±	63.50	0.99
	20	1	1	100.0	366 ±	-	510 ±	-	1.04
Total		25	17	68.0	308 ±	47.50	309 ±	137.45	0.99

± = standard deviation

Table 29. Age specific size and maturity conditions of sauger from Threepoint Lake, 1989.

Sex	Age (Years)	Number	Maturity: Number Mature	Maturity: % Mature	Fl ± s.d. (mm)	Wt ± s.d. (g)	Mean Condition Factor
Males	2	10	0	0.0	178 ± 28.48	54 ± 29.45	0.89
	3	3	0	0.0	200 ± 20.00	72 ± 28.35	0.87
	4	10	2	20.0	229 ± 14.79	114 ± 23.56	0.94
	5	34	1	2.9	232 ± 14.46	121 ± 26.44	0.96
	6	13	2	15.4	254 ± 9.90	151 ± 19.30	0.92
	7	6	2	33.3	253 ± 15.00	146 ± 35.52	0.88
	8	12	4	33.3	267 ± 13.63	179 ± 37.54	0.93
	9	1	0	0.0	292 ± -	246 ± -	0.99
	11	1	1	100.0	262 ± -	186 ± -	1.03
	12	4	0	0.0	290 ± 11.66	230 ± 8.64	0.95
	13	4	4	100.0	310 ± 22.29	274 ± 55.89	0.91
	14	1	1	100.0	300 ± -	242 ± -	0.90
Total		99	17	17.2	241 ± 34.68	138 ± 57.84	0.93
Females	2	7	0	0.0	199 ± 27.17	84 ± 34.99	1.02
	3	2	0	0.0	195 ± 4.24	69 ± 4.24	0.93
	4	11	1	9.1	237 ± 10.09	122 ± 16.19	0.92
	5	26	0	0.0	237 ± 19.50	129 ± 28.68	0.96
	6	20	2	10.0	259 ± 18.69	173 ± 35.04	0.98
	7	12	1	8.3	259 ± 22.84	169 ± 47.44	0.95
	8	20	2	10.0	278 ± 15.68	197 ± 39.63	0.90
	12	4	1	25.0	291 ± 13.89	231 ± 45.21	0.93
	13	9	7	77.8	301 ± 13.20	263 ± 48.23	0.96
	15	1	0	0.0	342 ± -	378 ± -	0.94
Total		112	14	12.5	256 ± 32.57	165 ± 61.60	0.95
Both	2	17	0	0.0	187 ± 29.09	66 ± 34.37	0.95
	3	5	0	0.0	198 ± 14.56	71 ± 20.23	0.90
	4	21	3	14.3	233 ± 12.88	118 ± 19.98	0.92
	5	60	1	1.7	234 ± 16.89	124 ± 27.51	0.96
	6	33	4	12.1	257 ± 15.88	164 ± 31.41	0.96
	7	18	3	16.7	257 ± 20.27	161 ± 44.16	0.93
	8	32	6	18.8	274 ± 15.74	190 ± 39.25	0.91
	9	1	0	0.0	292 ± -	246 ± -	0.99
	11	1	1	100.0	262 ± -	186 ± -	1.03
	12	8	1	12.5	290 ± 11.88	230 ± 30.13	0.94
	13	13	11	84.6	304 ± 16.04	266 ± 48.57	0.94
	14	1	1	100.0	300 ± -	242 ± -	0.90
	15	1	0	0.0	342 ± -	378 ± -	0.94
Total		211	31	14.7	249 ± 34.32	152 ± 61.25	0.94

± = standard deviation
Number of fish with unknown sex and maturity that were excluded = 1

Table 30. Age specific size and maturity conditions of northern pike from Rat Lake, 1989.

Sex	Age (Years)	Number	Maturity: Number Mature	Maturity: % Mature	Fl ± s.d. (mm)	Wt ± s.d. (g)	Mean Condition Factor
Males	3	3	2	66.7	367 ± 5.03	305 ± 17.01	0.62
	4	6	5	83.3	408 ± 44.80	481 ± 168.51	0.69
	5	9	8	88.9	447 ± 27.02	580 ± 79.91	0.65
	6	5	4	80.0	468 ± 48.26	712 ± 206.26	0.68
	7	2	2	100.0	568 ± 62.23	1310 ± 579.83	0.69
	8	1	1	100.0	668 ± -	2320 ± -	0.78
	10	1	1	100.0	528 ± -	950 ± -	0.65
	12	1	1	100.0	842 ± -	4600 ± -	0.77
Total		28	24	85.7	467 ± 103.50	824 ± 856.27	0.67
Females	2	1	0	0.0	330 ± -	226 ± -	0.63
	3	4	2	50.0	404 ± 39.09	449 ± 138.53	0.66
	4	14	1	7.1	420 ± 35.44	490 ± 119.31	0.65
	5	14	4	28.6	468 ± 53.26	735 ± 356.58	0.68
	6	4	3	75.0	523 ± 78.44	1021 ± 602.75	0.66
	7	1	0	0.0	442 ± -	620 ± -	0.72
	9	3	3	100.0	781 ± 75.37	3750 ± 655.06	0.80
	10	5	5	100.0	773 ± 71.23	3628 ± 1117.71	0.76
	11	4	4	100.0	853 ± 48.26	4800 ± 612.92	0.77
	12	5	5	100.0	836 ± 66.73	4350 ± 1470.07	0.72
	13	1	1	100.0	814 ± -	4360 ± -	0.81
	15	1	1	100.0	948 ± -	7240 ± -	0.85
Total		57	29	50.9	570 ± 188.93	1856 ± 1911.97	0.70
Both	2	1	0	0.0	330 ± -	226 ± -	0.63
	3	7	4	57.1	388 ± 34.22	387 ± 124.69	0.64
	4	20	6	30.0	417 ± 37.72	487 ± 131.26	0.66
	5	23	12	52.2	460 ± 45.32	674 ± 288.97	0.67
	6	9	7	77.8	492 ± 65.64	849 ± 428.89	0.67
	7	3	2	66.7	526 ± 85.02	1080 ± 571.66	0.70
	8	1	1	100.0	668 ± -	2320 ± -	0.78
	9	3	3	100.0	781 ± 75.37	3750 ± 655.06	0.80
	10	6	6	100.0	732 ± 118.52	3182 ± 1481.45	0.74
	11	4	4	100.0	853 ± 48.26	4800 ± 612.92	0.77
	12	6	6	100.0	837 ± 59.74	4392 ± 1318.82	0.73
	13	1	1	100.0	814 ± -	4360 ± -	0.81
	15	1	1	100.0	948 ± -	7240 ± -	0.85
Total		85	53	62.4	536 ± 172.02	1516 ± 1706.17	0.69

± = standard deviation

Table 31. Age specific size and maturity conditions of northern pike from Threepoint Lake, 1989.

Sex	Age (Years)	Number	Maturity: Number Mature	Maturity: % Mature	Fl ± s.d. (mm)	Wt ± s.d. (g)	Mean Condition Factor
Males	1	17	2	11.8	283 ± 43.62	162 ± 69.19	0.70
	2	9	2	22.2	330 ± 18.05	228 ± 33.43	0.63
	3	6	1	16.7	348 ± 59.32	310 ± 77.88	0.79
	4	1	0	0.0	394 ± -	310 ± -	0.51
	7	1	1	100.0	666 ± -	2140 ± -	0.72
Total		34	6	17.6	321 ± 78.86	268 ± 341.02	0.69
Females	0	2	0	0.0	233 ± 41.01	95 ± 35.36	0.75
	1	12	0	0.0	310 ± 35.46	199 ± 61.76	0.65
	2	7	0	0.0	356 ± 47.07	320 ± 115.37	0.69
	3	4	1	25.0	372 ± 36.01	348 ± 97.88	0.67
	4	3	0	0.0	436 ± 10.58	527 ± 74.90	0.63
	5	1	0	0.0	462 ± -	484 ± -	0.49
	6	1	1	100.0	630 ± -	1980 ± -	0.79
	8	1	1	100.0	636 ± -	2040 ± -	0.79
	9	1	1	100.0	832 ± -	4300 ± -	0.75
	10	1	1	100.0	784 ± -	414 ± -	0.09
Total		33	5	15.2	403 ± 165.06	681 ± 1253.19	0.66
Both	0	2	0	0.0	233 ± 41.01	95 ± 35.36	0.75
	1	29	2	6.9	294 ± 42.04	177 ± 67.63	0.68
	2	16	2	12.5	341 ± 35.27	268 ± 90.37	0.66
	3	10	2	20.0	358 ± 50.30	325 ± 83.36	0.74
	4	4	0	0.0	426 ± 22.71	473 ± 124.69	0.60
	5	1	0	0.0	462 ± -	484 ± -	0.49
	6	1	1	100.0	630 ± -	1980 ± -	0.79
	7	1	1	100.0	666 ± -	2140 ± -	0.72
	8	1	1	100.0	636 ± -	2040 ± -	0.79
	9	1	1	100.0	832 ± -	4300 ± -	0.75
	10	1	1	100.0	784 ± -	414 ± -	0.09
Total		67	11	16.4	362 ± 134.88	475 ± 934.96	0.68

± = standard deviation
Number of fish with unknown age that were excluded = 1

Table 32. Age specific size and maturity conditions of white sucker from Rat Lake, 1989.

Sex	Age (Years)	Number	Maturity: Number Mature	Maturity: % Mature	Fl ± s.d. (mm)	Wt ± s.d. (g)	Mean Condition Factor
Males	5	2	1	50.0	351 ± 7.07	685 ± 49.50	1.59
	6	3	3	100.0	347 ± 18.58	681 ± 155.34	1.61
	8	2	2	100.0	413 ± 1.41	1070 ± 70.71	1.52
	16	2	2	100.0	418 ± 48.08	1230 ± 381.84	1.66
	17	2	2	100.0	446 ± 16.97	1305 ± 106.07	1.47
	18	1	1	100.0	440 ± -	1350 ± -	1.58
	23	1	0	0.0	424 ± -	1220 ± -	1.60
Total		13	11	84.6	397 ± 44.67	1015 ± 314.49	1.58
Females	3	1	0	0.0	244 ± -	240 ± -	1.65
	5	1	0	0.0	306 ± -	476 ± -	1.66
	6	3	2	66.7	400 ± 23.07	1007 ± 187.17	1.56
	7	4	4	100.0	410 ± 9.15	1153 ± 134.51	1.67
	8	3	3	100.0	408 ± 22.27	1143 ± 275.38	1.66
	14	1	1	100.0	472 ± -	1800 ± -	1.71
	15	1	0	0.0	450 ± -	1760 ± -	1.93
	16	3	3	100.0	468 ± 30.20	1670 ± 533.95	1.59
	17	1	1	100.0	422 ± -	1230 ± -	1.64
	20	1	1	100.0	462 ± -	1680 ± -	1.70
Total		19	15	78.9	412 ± 58.28	1224 ± 470.19	1.65
Both	3	1	0	0.0	244 ± -	240 ± -	1.65
	5	3	1	33.3	336 ± 26.46	615 ± 125.64	1.61
	6	6	5	83.3	373 ± 34.70	844 ± 235.69	1.59
	7	4	4	100.0	410 ± 9.15	1153 ± 134.51	1.67
	8	5	5	100.0	410 ± 16.00	1114 ± 201.94	1.60
	14	1	1	100.0	472 ± -	1800 ± -	1.71
	15	1	0	0.0	450 ± -	1760 ± -	1.93
	16	5	5	100.0	448 ± 42.24	1494 ± 486.91	1.62
	17	3	3	100.0	438 ± 18.33	1280 ± 86.60	1.53
	18	1	1	100.0	440 ± -	1350 ± -	1.58
	20	1	1	100.0	462 ± -	1680 ± -	1.70
	23	1	0	0.0	424 ± -	1220 ± -	1.60
Total		32	26	81.3	406 ± 52.91	1139 ± 421.37	1.62

± = standard deviation

Table 33. Age specific size and maturity conditions of white sucker from Threepoint Lake, 1989.

Sex	Age (Years)	Number	Maturity: Number Mature	Maturity: % Mature	Fl ± s.d. (mm)	Wt ± s.d. (g)	Mean Condition Factor
Males	2	2	0	0.0	196 ± 33.94	107 ± 35.36	1.43
	3	2	0	0.0	256 ± 59.40	273 ± 207.89	1.44
	4	1	1	100.0	252 ± -	340 ± -	2.12
	5	2	1	50.0	366 ± 5.66	681 ± 72.12	1.39
	6	4	0	0.0	375 ± 12.37	788 ± 70.89	1.50
	7	5	2	40.0	378 ± 19.15	822 ± 145.32	1.51
	8	1	0	0.0	378 ± -	784 ± -	1.45
	9	1	0	0.0	402 ± -	960 ± -	1.48
	10	1	0	0.0	400 ± -	900 ± -	1.41
	11	14	8	57.1	405 ± 15.20	986 ± 108.60	1.48
	12	9	4	44.4	409 ± 10.82	1043 ± 91.65	1.53
	13	5	3	60.0	426 ± 25.65	1100 ± 229.89	1.41
	14	6	0	0.0	418 ± 12.07	1070 ± 66.93	1.47
	15	4	2	50.0	426 ± 8.79	1083 ± 50.58	1.40
	16	4	3	75.0	442 ± 29.05	1228 ± 250.52	1.41
	17	4	2	50.0	420 ± 18.62	1083 ± 62.38	1.47
	18	5	1	20.0	440 ± 7.07	1244 ± 143.11	1.46
	19	3	1	33.3	442 ± 42.33	1263 ± 277.91	1.46
	20	1	0	0.0	430 ± -	1060 ± -	1.33
	21	1	0	0.0	412 ± -	1000 ± -	1.43
Total		75	28	37.3	399 ± 52.58	969 ± 273.27	1.47
Females	5	4	2	50.0	373 ± 4.16	845 ± 52.60	1.63
	6	3	3	100.0	396 ± 18.33	963 ± 125.83	1.55
	7	6	4	66.7	402 ± 27.42	970 ± 215.03	1.48
	8	2	1	50.0	419 ± 26.87	1105 ± 106.07	1.51
	9	4	2	50.0	433 ± 25.68	1185 ± 299.50	1.44
	11	7	7	100.0	431 ± 26.37	1244 ± 245.75	1.54
	12	10	7	70.0	436 ± 19.77	1204 ± 171.15	1.44
	13	7	5	71.4	467 ± 21.72	1521 ± 220.41	1.48
	14	4	4	100.0	470 ± 14.70	1500 ± 143.29	1.44
	15	5	4	80.0	457 ± 22.57	1410 ± 128.06	1.48
	16	4	3	75.0	451 ± 37.78	1355 ± 325.12	1.46
	17	1	1	100.0	474 ± -	1750 ± -	1.64
	18	3	2	66.7	482 ± 9.17	1727 ± 185.83	1.55
	22	1	1	100.0	472 ± -	1560 ± -	1.48
Total		61	46	75.4	436 ± 36.04	1258 ± 300.61	1.50
Both	2	2	0	0.0	196 ± 33.94	107 ± 35.36	1.43
	3	2	0	0.0	256 ± 59.40	273 ± 207.89	1.44
	4	1	1	100.0	252 ± -	340 ± -	2.12
	5	6	3	50.0	371 ± 5.47	790 ± 99.36	1.55
	6	7	3	42.9	384 ± 17.90	863 ± 128.93	1.52
	7	11	6	54.5	391 ± 25.97	903 ± 193.67	1.49
	8	3	1	33.3	405 ± 30.35	998 ± 199.93	1.49
	9	5	2	40.0	426 ± 26.09	1140 ± 278.21	1.45
	10	1	0	0.0	400 ± -	900 ± -	1.41
	11	21	15	71.4	414 ± 22.50	1072 ± 203.22	1.50
	12	19	11	57.9	423 ± 21.14	1128 ± 158.66	1.48
	13	12	8	66.7	450 ± 30.65	1346 ± 304.64	1.45
	14	10	4	40.0	439 ± 29.56	1242 ± 242.16	1.46
	15	9	6	66.7	443 ± 23.54	1264 ± 197.36	1.45
	16	8	6	75.0	446 ± 31.57	1291 ± 277.20	1.44
	17	5	3	60.0	431 ± 29.04	1216 ± 303.36	1.50
	18	8	3	37.5	456 ± 22.91	1425 ± 289.78	1.49
	19	3	1	33.3	442 ± 42.33	1263 ± 277.91	1.46
	20	1	0	0.0	430 ± -	1060 ± -	1.33
	21	1	0	0.0	412 ± -	1000 ± -	1.43
	22	1	1	100.0	472 ± -	1560 ± -	1.48
Total		136	74	54.4	415 ± 49.34	1099 ± 319.38	1.48

± = standard deviation

Number of fish with unknown age, sex and maturity that were excluded = 146

Table 34. Age specific size and maturity conditions of longnose sucker from Rat Lake, 1989.

Sex	Age (Years)	Number	Maturity: Number Mature	Maturity: % Mature	Fl ±	s.d. (mm)	Wt ±	s.d. (g)	Mean Condition Factor
Males	6	1	0	0.0	348 ±	-	706 ±	-	1.68
	9	2	2	100.0	486 ±	19.80	2040 ±	197.99	1.78
	10	1	1	100.0	452 ±	-	1580 ±	-	1.71
Total		4	3	75.0	443 ±	66.32	1592 ±	639.20	1.73
Females	8	1	1	100.0	458 ±	-	1480 ±	-	1.54
	16	1	1	100.0	562 ±	-	3340 ±	-	1.88
Total		2	2	100.0	510 ±	73.54	2410 ±	1315.22	1.71
Both	6	1	0	0.0	348 ±	-	706 ±	-	1.68
	8	1	1	100.0	458 ±	-	1480 ±	-	1.54
	9	2	2	100.0	486 ±	19.80	2040 ±	197.99	1.78
	10	1	1	100.0	452 ±	-	1580 ±	-	1.71
	16	1	1	100.0	562 ±	-	3340 ±	-	1.88
Total		6	5	83.3	465 ±	70.13	1864 ±	877.36	1.73

± = standard deviation

Table 35. Age specific size and maturity conditions of longnose sucker from Threepoint Lake, 1989.

Sex	Age (Years)	Number	Maturity: Number Mature	Maturity: % Mature	Fl ± s.d. (mm)	Wt ± s.d. (g)	Mean Condition Factor
Males	9	1	1	100.0	430 ± -	1390 ± -	1.75
	10	2	1	50.0	416 ± 22.63	1095 ± 134.35	1.52
	15	1	1	100.0	462 ± -	1420 ± -	1.44
	16	1	0	0.0	522 ± -	1840 ± -	1.29
	18	1	1	100.0	442 ± -	1410 ± -	1.63
	23	1	1	100.0	486 ± -	1500 ± -	1.31
Total		7	5	71.4	453 ± 40.48	1393 ± 260.75	1.49
Females	2	1	0	0.0	178 ± -	82 ± -	1.45
	6	1	1	100.0	406 ± -	900 ± -	1.34
	8	3	2	66.7	449 ± 60.34	1247 ± 600.44	1.31
	9	3	2	66.7	426 ± 16.37	1107 ± 185.83	1.43
	10	3	3	100.0	428 ± 24.33	1070 ± 221.13	1.36
	14	1	1	100.0	530 ± -	2080 ± -	1.40
	16	1	1	100.0	544 ± -	2400 ± -	1.49
	18	1	1	100.0	402 ± -	1060 ± -	1.63
	20	1	1	100.0	526 ± -	2500 ± -	1.72
	22	1	1	100.0	522 ± -	2400 ± -	1.69
Total		16	13	81.3	439 ± 87.37	1356 ± 697.00	1.44
Both	2	1	0	0.0	178 ± -	82 ± -	1.45
	6	1	1	100.0	406 ± -	900 ± -	1.34
	8	3	2	66.7	449 ± 60.34	1247 ± 600.44	1.31
	9	4	3	75.0	427 ± 13.52	1178 ± 207.59	1.51
	10	5	4	80.0	423 ± 21.61	1080 ± 170.73	1.42
	14	1	1	100.0	530 ± -	2080 ± -	1.40
	15	1	1	100.0	462 ± -	1420 ± -	1.44
	16	2	1	50.0	533 ± 15.56	2120 ± 395.98	1.39
	18	2	2	100.0	422 ± 28.28	1235 ± 247.49	1.63
	20	1	1	100.0	526 ± -	2500 ± -	1.72
	22	1	1	100.0	522 ± -	2400 ± -	1.69
	23	1	1	100.0	486 ± -	1500 ± -	1.31
Total		23	18	78.3	443 ± 75.50	1367 ± 591.67	1.46

± = standard deviation
Number of fish with unknown sex and maturity that were excluded = 19

Table 36. Length-weight regressions for fish caught from Rat Lake, 1989.

Species	Length-weight equation	r	n
Whitefish	$\log_e$ weight = -12.826 + 3.306 ($\log_e$ length)	0.987	439
Cisco	$\log_e$ weight = -13.149 + 3.359 ($\log_e$ length)	0.989	158
Walleye	$\log_e$ weight = -12.563 + 3.195 ($\log_e$ length)	0.996	259
Sauger	$\log_e$ weight = -12.256 + 3.127 ($\log_e$ length)	0.990	25
Northern Pike	$\log_e$ weight = -13.168 + 3.205 ($\log_e$ length)	0.995	85
White sucker	$\log_e$ weight = -11.210 + 3.030 ($\log_e$ length)	0.985	32
Longnose sucker	$\log_e$ weight = -12.349 + 3.225 ($\log_e$ length)	0.993	6
Yellow perch	insufficient data		1
Burbot	$\log_e$ weight = -11.439 + 2.944 ($\log_e$ length)	0.984	18

Table 37. Length-weight regressions for fish caught from Threepoint Lake, 1989.

Species	Length-weight equation	r	n
Whitefish	$\log_e$ weight = -11.598 + 3.082 ($\log_e$ length)	0.960	191
Cisco	$\log_e$ weight = -12.432 + 3.230 ($\log_e$ length)	0.950	239
Walleye	$\log_e$ weight = -11.677 + 3.034 ($\log_e$ length)	0.995	436
Sauger	$\log_e$ weight = -11.399 + 2.968 ($\log_e$ length)	0.979	212
Northern Pike	$\log_e$ weight = - 9.907 + 2.653 ($\log_e$ length)	0.945	68
White sucker	$\log_e$ weight = -10.650 + 2.925 ($\log_e$ length)	0.974	282
Longnose sucker	$\log_e$ weight = -11.522 + 3.063 ($\log_e$ length)	0.982	42
Shorthead redhorse sucker	insufficient data		2
Yellow perch	$\log_e$ weight = - 9.170 + 2.659 ($\log_e$ length)	0.971	9
Burbot	$\log_e$ weight = -10.494 + 2.773 ($\log_e$ length)	0.913	5

Table 38. Mortality and survival estimates for whitefish, cisco, walleye, sauger and northern pike from Rat and Threepoint lakes, 1989.

Species	Lake	Instantaneous mortality (Z)	Annual mortality (A)	Annual survival (S)	r	Age classes used
Whitefish	Rat	0.449	0.362	0.638	0.956	13-21 1.
	Threepoint	0.433	0.351	0.649	0.847	13-19 2.
Cisco	Rat	0.296	0.256	0.744	0.787	7-17 3.
	Threepoint		*			
Walleye	Rat	0.161	0.149	0.851	0.609	17-27 4.
	Threepoint	0.234	0.208	0.792	0.905	7-28 5.
Sauger	Rat	0.188	0.171	0.829	0.974	6-14 6.
	Threepoint	0.406	0.333	0.667	0.892	6-15 7.
Northern Pike	Rat	0.238	0.212	0.788	0.838	6-15 8.
	Threepoint	0.346	0.292	0.708	0.837	2-10

* insufficient data for reasonable analysis.
1. age class 19 missing.
2. age classes 16 and 18 missing.
3. age class 16 missing.
4. age classes 21 and 25 missing.
5. ages combined: 7, 8 and 9; 10, 11, and 12; while age classes 18, 21 and 24-27 were missing.
6. age classes 7-11 missing.
7. ages combined: 6 and 7; 9, 11 and 12; while age class 10 was missing.
8. ages combined: 7, 8 and 9; while age 14 was missing.

Table 39. Maturity rate equations and age at maturity for whitefish, cisco, walleye, sauger and northern pike from Rat and Threepoint lakes, 1989.

Species	Lake	Sex	Regression	r	Age at 50% mature (yrs)	Age classes used
Whitefish	Rat	males	6.161 - 0.670 (x)	0.957	9.2	7-13
		females	2.193 - 0.389 (x)	0.717*	5.6	7-13
		both	4.852 - 0.581 (x)	0.978	8.4	7-13
	Threepoint	all	**			
Cisco	Rat	males	2.194 - 0.353 (x)	0.819	6.2	5-12
		females	1.850 - 0.357 (x)	0.962	5.2	5-12
		both	2.129 - 0.326 (x)	0.700	6.5	4-12
	Threepoint	males	4.180 - 0.631 (x)	0.995	6.6	5-9
		females	2.132 - 0.430 (x)	0.973	5.0	5-8
		both	2.487 - 0.752 (x)	0.966	3.3	2-4
Walleye	Rat	males	6.627 - 0.820 (x)	0.933	8.1	5-8
		females	5.414 - 0.449 (x)	0.762*	12.0	9-14
		both	4.792 - 0.440 (x)	0.820	10.9	5-14
	Threepoint	males	**			
		females	3.052 - 0.223 (x)	0.855	13.7	7-19
		both	3.936 - 0.249 (x)	0.862	15.8	5-20
Sauger	Threepoint	males	7.799 - 0.946 (x)	0.919	8.2	5-8
		females	6.175 - 0.506 (x)	0.889	12.2	7-13
		both	3.900 - 0.410 (x)	0.963	9.5	4-13
Northern pike	Rat	males	1.311 - 0.693 (x)	0.984	2.0	3-5
		females	2.825 - 0.495 (x)	0.412*	5.7	3-6
		both	5.088 - 1.051 (x)	0.998	4.8	4-6
	Threepoint	males	2.029 - 0.202 (x)	0.534*	10.0	1-3
		females	**			
		both	3.194 - 0.608 (x)	0.999	5.3	1-3

* non-significant at P=0.05.
** insufficient data for reasonable analysis.

Table 40. Walford equation data for whitefish, cisco, walleye, sauger and northern pike from Rat and Threepoint lakes, 1989.

Species	Lake	Walford Equation	L_∞	Age classes used	r
Whitefish	Rat	71.464 + 0.865 (x)	529	2-18	0.969
	Threepoint	106.127 + 0.756 (x)	434	3-17	0.936
Cisco	Rat	76.606 + 0.799 (x)	381	2-12	0.948
	Threepoint	91.924 + 0.736 (x)	348	2-11	0.895
Walleye	Rat	73.252 + 0.840 (x)	458	1-10	0.966
	Threepoint	69.235 + 0.836 (x)	420	4-14	0.930
Sauger	Threepoint	41.495 + 0.887 (x)	366	2-9	0.924
Northern pike	Rat	88.485 + 0.933 (x)	1322	2-12	0.944
	Threepoint	96.193 + 0.893 (x)	894	0-8	0.931

Table 41. Brody relationship for whitefish, cisco, walleye, sauger and northern pike from Rat and Threepoint lakes, 1989.

Species	Lake	$Log_e (L_\infty - lt) = a-b.t$	Age range (years)	r
Whitefish	Rat	6.373 - 0.156 (x)	2-18	0.911
	Threepoint	5.924 - 0.249 (x)	3-14	0.905
Cisco	Rat	5.910 - 0.232 (x)	2-12	0.954
	Threepoint	5.925 - 0.376 (x)	2-11	0.960
Walleye	Rat	6.128 - 0.202 (x)	1-10	0.947
	Threepoint	6.014 - 0.178 (x)	4-14	0.935
Sauger	Threepoint	5.440 - 0.119 (x)	2-9	0.982
Northern pike	Rat	7.129 - 0.081 (x)	2-11	0.956
	Threepoint	6.607 - 0.148 (x)	0-7	0.936

Table 42. Least squares regression full transformation (power curve) analysis of variance summaries for growth curves from whitefish, cisco, walleye, sauger and norther pike from Rat and Threepoint lakes, 1989.

Species	Lake	Equation	r	d.f.	F. ratio
Whitefish	Rat	128.257 X Λ0.472	0.969	1, 18	257.23
	Threepoint	223.332 X Λ0.244	0.962	1, 14	160.32
Cisco	Rat	127.930 X Λ0.426	0.975	1, 14	255.44
	Threepoint	159.903 X Λ0.324	0.932	1, 12	72.34
Walleye	Rat	140.436 X Λ0.393	0.962	1, 24	288.89
	Threepoint	151.037 X Λ0.345	0.969	1, 22	323.31
Sauger	Threepoint	155.405 X Λ0.262	0.960	1, 12	127.89
Northern pike	Rat	202.216 X Λ0.561	0.972	1, 12	190.23
	Threepoint	249.661 X Λ0.475	0.945	1, 9	66.93

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Appendix 1. List of Manitoba Department of Natural Resources Fisheries Branch reports written to date on data collected from the Churchill-Nelson River Diversion under the Northern Flood Agreement Claim numbers 12 and 18. Documents are listed in chronological order of publication.

Year	Title
1984	Patalas, J.W. 1984. Fish population data from Sipiwesk, Split and Stephens lakes, 1983. Man. Dept. Nat. Res. Fish. Br. MS Report No. 84-24, 66pp.
	_____ 1984. Fish population data from Notigi, Wapisu, Threepoint and Footprint lakes, 1983. Man. Dept. Nat. Res. Fish. Br. MS Report No. 84-25, 70pp.
1986	Derksen, A.J. 1986. Ecological Monitoring - Fisheries 1985 Progress Report. Man. Dept. Nat. Res. Fish. Br. April 9, 1986. 43.pp.
	Kirton, J.A.W. 1986. Fish population data from Rat, Karsakuwigamak, and West West and Central Mynarski lakes, 1984. Man. Dept. Nat. Res. Fish. Br. MS Report No. 86-03, 48pp.
	_____ 1986. Fish population data from Split and Stephens lakes, 1984. Man. Dept. Nat. Res. Fish. Br. MS Report No. 86-04, 61pp.
	Green, D.J. 1986. Summary of Fish mercury data collected from lakes on the Rat-Burntwood and Nelson River systems, 1983-1985. Man. Dept. Nat. Res. MS Report No. 86-06, 359 pp.
	Mohr, L.C. and J.A.W. Kirton. 1986. Fish population data from Sipiwesk and Cross lakes, 1985. Man. Dept. Nat. Res. Fish. Br. MS Report No. 86-28, 83pp.
1987	Sopuck, R. D. 1987. A study of lake sturgeon (Acipenser fulvescens) in the Sipiwesk Lake area of the Nelson River, Manitoba, 1976-1978. Man. Dept. Nat. Res., Fish. Br. MS Report No. 87-2, 59pp.
	Hagenson, I. 1987. Fish population data from Rat and Split lakes, 1985. Man. Dept. Nat. Res. Fish. Br. MS Report No. 87-04, 59pp.
	Kirton, J.A.W. 1987. Fish population data from Macheewin, Osik, Footprint and Threepoint lakes, 1984. Man. Dept. Nat. Res. Fish. Br. MS Report No. 87-06, 78pp.

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Year	Title
1987	Green, D.J. 1987. Summary of fish population data from Rat and Threepoint lakes, 1986. Man. Dept. Nat. Res. Fish. Br. MS. Report No. 87-07, 47pp.
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	Sopuck, R.D. 1987. An analysis of changes in the Pipestone Lake fish community from 1980 to 1986. Man. Dept. Nat. Res., Fish. Br. MS Report No. 87-11, 59pp & Appendices.
	Livingston, L. 1987. A checklist of phytoplankton genera for Nelson River and Rat-Burntwood lakes, 1980, 1981 and 1986. Man. Dept. Nat. Res. Fish. Br. MS Report No. 87-14, 20pp.
	Hagenson, I. 1987. Fish population data from Split and Stephens lakes, 1986. Man. Dept. Nat. Res. Fish. Br. MS Report No. 87-26, 59pp.
	Green, D.J. 1987. Summary of fish population data collected from eight lakes on the Rat-Burntwood River System, 1985. Man. Dept. Nat. Res. Fish. Br. MS Report No. 87-27, 130pp.
	Mohr, L. 1987. Fish population data from Sipiwesk and Cross lakes, 1986. Man. Dept. Nat. Res. Fish. Br. MS Report No. 87-28, 87pp.
	Anonymous. 1987. A manual for ecological monitoring - data collection procedures. Man. Dept. Nat. Res. Fish. Br. June, 1987.
	Mohr, L. and Livingston, L. 1987. Ecological monitoring zooplankton analysis methodology for 1986/87. Man. Dept. Nat. Res. Fish. Br. June, 1987.
	Derksen, A.J. and D.J. Green. Total mercury concentrations in large fishes from lakes on the Churchill River Diversion and Nelson River. Canada-Manitoba Agreement on the Study and Monitoring of Mercury in Churchill River Diversion. Tech. Appendices to Summary Report Volume 4, paper no. 17.

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Year	Title
1988	Derksen, A.J. et.al. 1988. Ecological Monitoring - Fisheries 1986 Progress Report. Man. Dept. Nat. Res. Fish. Br. March, 1988.
	Livingston, L. 1988. Summary of phytoplankton data for the Nelson River and Rat-Burntwood lakes, 1987. Man. Dept. Nat. Res. Fish. Br. MS Report No. 88-04, 164pp.
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	Patalas, J.W. 1988. The effects of commercial fishing on lake sturgeon (Acipenser fulvescens) populations in the Sipiwesk Lake area of the Nelson River, Manitoba, 1987-1988. Man. Dept. Nat. Res. Fish. Br. MS Report No. 88-14, 38pp.
	Hagenson, I. 1988. Fish population data from Split and Stephens lakes, 1987. Man. Dept. Nat. Res. Fish. Br. MS Report No. 88-15, 66pp.
1989	Green, D.J. 1989. Summary of fish population data from Sipiwesk and Cross lakes, 1988. Man. Dept. Nat. Res. Fish. Br. MS. Report No. 89-11, 91pp.
	Livingston, L.R. 1989. Summary of phytoplankton data for the Nelson River and Rat-Burntwood lakes, 1988. Man. Dept. Nat. Res. Fish. Br. MS Report No. 89-07, 81pp.
	Green, D. J. 1989. Summary of fish population data from Sipiwesk and Cross lakes, 1988. Man. Dept. Nat. Res. Fish. Br. MS Report No. 89-11, 91pp.
	Green, D.J. 1989. Summary of fish population data from Rat and Threepoint lakes, 1988. Man. Dept. Nat. Res. Fish. Br. MS Report No. 89-13, 69pp.

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Year	Title
1989	Cherepak, B. C. 1989. The post-flood morphometry and bathymetry of Rat and Threepoint lakes, 1988. Man. Dept. Nat. Res. Fish. Br. MS Report No. 89-14.
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